GSMO TASK ORDER

Task No:	**34**
Modification:	5
Task Name:	**LRO Ground System Mission Planning and Scheduling**
Task Period of Performance:	October 1, 2013 to September 30, 2014
Modification Period of Performance:	June 30, 2014 to August 29, 2014
GSMO SOW Reference:	2.3.3.3, 2.4, 3.7.2.1

I. Task Order History

Description of current modification (Modification 5):

This is Modification 5 Task Order Statement of Work (SOW) for the Lunar Reconnaissance Orbiter (LRO) Ground System Mission Planning and Scheduling (MPS) system.

Mod #	Start	End	Brief Description
0	03/01/2012	09/30/2012	Initial Task Order Statement of Work.
1	10/01/2012	09/30/2013	Modification 1 Task Order Statement of Work
2	10/15/2012	10/17/2012	COTR initiated Modification 2
3	10/01/2013	09/30/2014	Modification 3 Task Order Statement of Work
4	01/24/2014	02/04/2014	COTR initiated Modification 4-RA Change
5	06/02/14	08/29/14	Modification 3 Task Order Statement of Work

II. Background

The latest and/or current version of the LRO MPS (Release 6.1) was developed to include new LOLA8 product capability and to fix compatibility issues that occurred with the upgrade from Oracle 10 to Oracle 11. The Oracle 11 upgrade is part of the LRO MOC transition to a Virtual environment, in which virtualization efforts have been delayed and currently are incomplete. Due to this delay, the LRO MOT wants the LOLA8 modifications implemented in Release 6.1, but not the Oracle 11 modifications.

III. Scope of Work

The Contractor shall provide the LRO project with a new release of the MPS software, which ensures the LOLA8 product, is compatible with Oracle 10. Any additional MPS requirements or ECRs will require a modification to the Task Order.

A. Requirements

A.1. The contractor shall separate and/or decouple the LOLA8 product from the Oracle 11 database, and ensure the LOLA8 product is compatible and works with Oracle 10.

B. Management Reporting

The Contractor shall provide monthly status reports and reviews on the technical, cost, schedule and operational performance in accordance with the WBS to adequately describe the activities of the task to the Task Monitor.

C. Contractor Controlled Property

The Contractor shall assist the GSMO contract managers and property custodians in maintaining the overall list (NPROP) of government owned property used by the Contractor on this Task Order. This support includes preparation and cooperation during property audits.

IV. Government Furnished Facilities, Equipment, Software, and Other Resources

There are no Government furnished facilities, equipment, or software associated with this Task Order.

V. Material Procurement

The Contractor shall propose material that they identify as necessary to perform the work associated with this Task Order. The Task Monitor shall concur with the materials list prior to procurement.

VI. Travel Support

The Contractor shall propose travel that they identify as necessary to perform the work associated with this Task Order.

Specifically, the contractor shall support the travel requirements as described in the table below:

Travel Description	Approximate Time Frame
None	N/A

VII. Deliverables

The Contractor shall provide the following deliverables in support of the Task Order:

ID	Deliverable Description	Due Date
1	Software Maintenance and Engineering Support	October 1, 2013 thru Sept 30, 2014
2	LROMPS/Oracle 11g Release 2-Version 11.2.0.3 Software Release *(Completed)*	NLT FY14 Qtr 2 (April 1, 2014)
3	Renew LROMPS Software Escrow Agreement	June 2014

4	LROMPS Release 6.2 (LOLA8/Oracle 10)	Aug 29, 2014
5	End of Task Report	Sept 30, 2014

End of Task Order Statement of Work

GSMO TASK ORDER

Task No:	**#35**
Modification:	11
Task Name:	JWST Ground System Support
Task Period of Performance:	3/1/2012 to 9/30/2015
Modification Period of Performance:	3/23/2015 to 9/30/2015
GSMO SOW Reference:	2.3.2, 2.4

I. Task Order History

Description of current modification (Modification 11): The initial task order statement of work authorizes the Contractor (Honeywell) to perform GSMO contract activities for the James Webb Space Telescope Ground Segment & Operations Office (JWST GS&O) Ground System Support.
(Modification 1): Mod 1 authorizes the Contractor to provide additional materials required to support the 1553 Interface and Communication network for ISIM I&T.
(Modification 2): Mod 2 authorizes the Contractor to provide additional materials required to provide adequate data storage during ISIM Cryo testing.
(Modification 3): Mod 3 authorizes the Contractor to provide labor & materials for IGSS for FY'13; and provide software engineering & management/support for ISIM FSW & the JWST Certification Lab for FY'13.
(Modification 4): Mod 4 authorizes the Contractor to provide additional materials required to support ISIM I&T and JSC
(Modification 5): Mod 5 adds additional staff to support Mission Engineering; IGSS System Engineering; IGSS System Development & Integration; IGSS Product Management Support; and IGSS Customer Support
(Modification 6): Mod 6 authorizes the Contractor to provide labor and materials for IGSS for FY'14 including a new task for providing a Software Telemetry Simulator (STS).
(Modification 7): Mod 7 authorizes the Contractor to provide additional materials required to enable hardware upgrades to the PSS supporting the JWST DSN I/F; enable the GSFC B29 GPM area renovation for JWST; and enable communication upgrades to the GPM area, ICC, and JSC network infrastructure.
(Modification 8): Mod 8 authorizes the Contractor to [redacted] assist [redacted]) in the development of combined HST/JWST IT Security documentation.
(Modification 9): Mod 9 is a 13-month modification. Mod 9 authorizes the Contractor to provide labor and materials for IGSS for FY'15; and material procurement starting in September 2014. The September procurements are for supporting preparation for Chamber commissioning @ JSC. For this modification scenario a one-time exception has been approved by the GSMO Contracting Officer.
(Modification 10): Mod 10 authorizes the Contractor to provide 1) Consulting Services to the JWST Project for review of the STScI JWST Primary MOC plans; 2) additional IT Security Expertise Assistance in support of the JWST ISSO; 3) a re-phasing of current IT Security expertise for the development of the combined HST/JWST IT Security documents (work to be phased within AFP-6); 4) additional material/fabrication to support the upgrade of the RF-PSS, and 5) renewal of any imminent COTS licenses and maintenance (covering 1/1/15 – 3/31/15).
(Modification 11): Mod 11 authorizes the Contractor to provide a continuation of STScI IT Security support and to provide additional materials and support required to enable:

- Selected existing IGSS JLABs @GSFC and @STScI: Upgrade Windows Server 2003 to Windows Server 2008 as determined necessary.
- GSFC B29 ISIM Control Center (ICC): Upgrade ICC workstations to meet high throughput applications.
- GSFC B13 IGSS Development: 1) Provide a backup archive server for historical engineering and telemetry data.
- GSFC IGSS Sparing & Maintenance: Provide minimal spares and licensing
- JSC: Provide PCs and TVs for JSC control center

Mod #	Start	End	Brief Description
0	03/01/2012	09/30/2012	Initial task order statement of work.
1	05/14/2012	09/30/2012	Additional materials required to support 1553 Interface and Communication network for ISIM I&T
2	8/15/2012	9/30/2012	Additional materials required to support ISIM Cryo testing
3	10/1/2012	9/30/2013	Provide labor & materials for IGSS; and provide software engineering management/support for ISIM FSW & the JWST Certification Lab for FY'13
4	12/17/2012	9/30/2013	Provide additional materials required to support ISIM I&T and JSC.
5	4/1/2013	9/30/2013	Add staff to support Mission Engineering; IGSS System Engineering; IGSS System Development & Integration; IGSS Product Management Support; and IGSS Customer Support
6	10/1/2013	9/30/2014	Provide labor and materials for IGSS for FY'14 including a new task for providing a Software Telemetry Simulator (STS)
7	2/1/2014	9/30/2014	Provide additional materials required to enable hardware upgrades to the PSS supporting the JWST DSN I/F; enable the GSFC B29 GPM area renovation for JWST; and enable communication upgrades to the GPM area, ICC. and JSC network infrastructure.
8	8/1/2014	9/30/2014	[redacted] in the development of combined HST/JWST IT Security documentation
9	9/1/2014	9/30/2015	Provide labor and materials for IGSS for FY'15 ; begin material procurement for JSC in September 2014
10	1/1/2015	9/30/2015	Provide 1) Consulting Services to the JWST Project for review of the STScI JWST Primary MOC plans; 2) additional IT Security Expertise Assistance in support of the JWST ISSO; 3) a re-phasing of current IT Security expertise for the development of the combined HST/JWST IT Security documents (work to be phased within AFP-6); 4) additional material/fabrication to support the upgrade of the RF-PSS, and 5) renewal of any imminent COTS licenses and maintenance (covering 1/1/15 – 3/31/15).
11	3/23/2015	9/30/2015	Provide additional materials required to enable: • Selected existing IGSS JLABs @GSFC and @STScI: Upgrade Windows Server 2003 to Windows Server 2008 as determined necessary. • GSFC B29 ISIM Control Center (ICC): Upgrade ICC workstations to meet high throughput applications. • GSFC B13 IGSS Development: 1) Provide a backup archive server for historical engineering and telemetry data. • GSFC IGSS Sparing & Maintenance: Provide minimal spares and licensing • JSC: Provide PCs and TVs for JSC control center

II. Background

This task provides products and services to the JWST GS&O Ground System Support for Integrated Ground Support Systems (IGSS) including the following:

- Material:
  - Procurement
  - Inventory Management including sparing
  - Shipping and Receiving
- JWST-IGSS Lab Systems (JLABs) hardware fabrication and sustaining for:
  - Internationally fielded Science Instrument Development Units (SIDUs) & Science Instrument Test Sets (SITS); and ISIM Integration & Test (IITS)
  - Northrop Grumman Aerospace Systems Software Development Lab ISIM Electrical Simulator (NGAS-SDL-IES)
- Software development and maintenance of simulation tools including:
  - Software Telemetry Simulator (STS)
- Integration & Test including:
  - IGSS Software and JLAB Builds
- Customer Support including:
  - Support for fielded JLABs
  - Support for ISIM I&T activities as related to IGSS ground systems
  - Support for ISIM I&T activities and configuration of ground systems and simulators
  - Support for NGAS activities and configuration of ground systems and simulators
- Reconfiguration of IGSS Lab areas
- Software engineering and management/support for ISIM FSW Development and Labs; and the JWST Certification Facility
- Mission Engineering; IGSS System Engineering; IGSS System Development & Integration; and IGSS Product Management Support including:
  - Mission Engineering Analysis
  - IGSS System Engineering
  - IGSS Tool Development
  - IGSS Customer Support
  - IGSS Product Management Support
- IT Security Support including:
  - Documentation Support for STScI (Mod 8 & 9 & 11)
    - Combined HST/JWST IT Documentation
    - Support for Assessment and Authorization process
  - IT Security Expertise Assistance in support of the JWST ISSO for meetings; assessment; and documentation leading to the ATO in mid-2015. (Mod 10)
- Other Consulting Support including:
  - Review of STScI JWST Primary MOC Plans (Mod 10)

III. Scope of Work

The Contractor shall assume full contract responsibility for this task including development and sustaining support for SIDU/SITS; IITS; JWST Certification Facility; JSC; and the NGAS-SDL-IES. The Contractor shall comply with CMMI for IGSS related work as established in the IGSS Software Management Plan / Product Plan (JWST-PLAN-010484) located on the JWST CM website (https://ngin.jwst.nasa.gov); and NASA Software Engineering Requirements (NPR 7150.2) located on the NASA Online Directives Information System (NODIS) website (http://nodis3.gsfc.nasa.gov). The Contractor shall retain current certificates of training for Electrostatic Discharge (ESD) Control in accordance with ANSI/ESD S20.20 as an Operator.

The Contractor shall not exceed the cost documented in their proposal.

A. Requirements

1) The Contractor shall provide IGSS Integration & Test Support including:
   - Integration of IGSS component software/hardware in the IGSS Lab
   - IGSS Software Build Functional Component testing & System Regression testing
   - IGSS JLAB System Regression testing
   - Completion of test Configuration Items (CIs) and delivery of CIs to locations identified in the IGSS Data Management List (DML) located on the JWST CM website.
   - Support Code 300 Software Quality Assurance participation in IGSS Test peer reviews and certain IGSS Release testing.

2) The Contractor shall provide Customer Support including:
   - Training and assistance for IGSS customers including SIDU/SITS; IITS; IES; and the JWST Certification Facility
   - User documentation and training materials
   - IGSS Help Desk support
   - Provide on-site support for custom installations as necessary. May require domestic or international travel.
   - Provide users with IGSS tools, configurations, and support

3) The Contractor shall provide procurement of hardware and COTS software including:
   - IGSS hardware product research, recommendation, and component procurement
   - COTS product research, recommendation, and procurement (compliant with NPR 7150.2)
   - Monitoring of Vendor license renewals and service agreement documentation
   - JLAB hardware sustaining support including procurement and documentation of appropriate sparing equipment for systems in the field
   - Additional materials required to enable hardware upgrades to JSC network infrastructure; GSFC B29 ICC (Mod 8); and the PSS-RF supporting the JWST DSN I/F.

4) The Contractor shall provide fabrication of JLABs and IGSS PCs including:
   - Documentation including elevation drawings; hardware specifications; European CE compliance letters; MSDS for hazardous components; and total weight/power consumption statement for final IGSS unit
   - Fabrication and shipping of JLABs and units supporting SIDU/SITS; IITS; JSC labs; JWST Certification Facility; and IES systems. (Including 6 ICDH-BAE Systems supporting existing JLABs)

5) The Contractor shall provide maintenance/sustaining of deployed systems including:
   - All IGSS JLABs and IGSS PCs
   - JWST-IGSS Lab area reconfigurations necessary to support IGSS development & integration.
   - Documentation regarding material and JLAB sparing for IITS and beyond. Will replace JWST-PLAN-011625 (JWST Project SITS/SIDU Sparing Plan)

6) The Contractor shall provide software engineering and management/support for ISIM; the JWST Certification Facility; and NGAS Systems including:
- ISIM
  - Manage ISIM FSW Lab
  - Manage/oversee simulator activities for ISIM
  - Support ISIM FSW development and testing activities
  - Support ISIM SI FSW activities
  - Support ISIM I&T activities
- Manage the JWST Certification Facility (including ESD audits)
- NGAS Systems:
  - ISIM Electrical Simulator (IES)
  - Engineering Model Test Bed (EMTB)
  - Basic ISIM Test Set (BITS)
  - Operation Test Bed (future)

7) The Contractor shall provide Mission Engineering; IGSS System Engineering; IGSS System Development & Integration; and Product Management Support:

- Mission Engineering Analysis
  - Review and provide comments on the design of various ground system elements
  - Attend reviews to determine impact on IGSS and ground operations
  - Provide analysis for prototype software as needed to demonstrate possible software solutions to problems

- IGSS System Engineering
  - Review and provide requirements for future IGSS elements
  - Provide analysis for custom software as needed to provide a more user friendly operational IGSS
  - Mature, update, and maintain IGSS Tools Level-4 requirements, IGSS Architecture, IGSS ICDs
  - Provide evaluation and analysis of COTS/GOTS ground system software/hardware components
  - Attend JWST and IGSS meetings, as necessary. Some meetings may require domestic or international travel

- IGSS System Development & Integration
  - Maintenance of Level-5 requirements for the IGSS Tools
  - Upgrade and support documentation/training for the IGSS Tools in support of:
    - Northrop Grumman Aerospace Systems (NGAS) & Raytheon development/testing of Eclipse upgrades
    - NGAS Integration & Test Sets
    - Science Instrument Development Units (SIDUs)
    - Science Instrument Test Sets (SITS)
    - FGS Verification Test Set (FVTS)
    - ISIM Integration & Test Sets (IITS) including the ISIM Development Facility
    - ISIM Electrical Simulator (IES) custom tools and integration
  - IGSS Tools include:
    - Load/dump generation and visualization tools
    - Database tools which interface with the Common Project Reference Database (PRD)
    - Eclipse Extension Tools for CECIL scripting use
    - IES Control interface process
    - Common Graphical User Interface (GUI)
    - Lab system configuration and configuration monitor tools
    - COTS and GOTS Software integration into IGSS

- Complete Tool Documentation and delivery to NGIN for appropriate documents listed above under "IGSS Tools"

- IGSS Functional Releases Supported:
  - IGSS releases for SITS
  - IGSS releases for IITS
  - IGSS releases for FVTS
  - IES for NGAS System Development Lab (SDL); Engineering Model Test Bed (EMTB); and the Observatory Test Bed (OTB)

- IGSS System Environment Maintenance
  - Provide for operating system installation/maintenance
  - Provide for updates of security patches to appropriate systems
  - Provide for new system hardware initialization and configuration
  - Provide for IITS file server maintenance and upgrades

- Software Telemetry Simulator (STS)
  - Manage Software Telemetry Simulator (STS) development and test activities including support for meetings with the spacecraft and instrument team.
    - Tasks developed include, but are not limited to, retrieving project artifacts; building flight software; launching STS executables; and executing system tests.
  - Develop a Software Telemetry Simulator (STS) for testing JWST spacecraft/instrument functions and provide documentation including:
    - Software Development Plan that addresses the software processes, methods, organizational responsibilities, tools, software quality, and other activities related to accomplishment the STS development
    - Design documents describing the design of individual components
    - Version Description Document for each release that includes details of the requirements included in the release and any known defects
  - Test the Software Telemetry Simulator and provide documentation including:
    - Test plan that validates the STS system has been implemented in a manner that satisfies the desired functionality;
    - User's manual that details the steps required to use the JWST STS environment.
  - Provide a version and training of the Software Telemetry Simulator (STS) for the JWST Space Telescope Science Institute (STScI)

- IGSS Product Management Support
  - Support the IGSS Product Manager in execution of the IGSS SMP/PP as directed.
  - Provide weekly progress report
  - Provide monthly Financial Summary and Progress Report

8) The Contractor shall provide IT Security Support (Mod 8 & 9 & 10 &11)

- Documentation Support for STScI (Mod 8 & 9 & 11) including:
  - Combined STScI HST/JWST Moderate Subordinate Security Plan (SSP)
  - Combined STScI HST/JWST Risk Assessment Report (RAR)
  - Combined STScI HST/JWST Contingency Plan (CP)
  - Support for Assessment and Authorization process

- IT Security Expertise Assistance in support of the JWST ISSO for meetings; assessment; and documentation leading to the ATO in mid-2015 (Mod 10)

9) The Contractor shall provide Other Consulting Support (Mod 10)
- Review of the STScI JWST Primary MOC Plans (Mod 10)

B. Management Reporting

The Contractor shall provide monthly status reports (including IT Security Support Mod 8, 9 & 10) and reviews on the technical, cost, schedule and operational performance in accordance with the WBS to adequately describe the activities of the task to the Task Monitor.

The Contractor shall provide weekly progress reports summarizing management and technical achievements and/or management and technical concerns.

C. Contractor Controlled Property

The Contractor shall assist the GSMO contract managers and property custodians in maintaining the overall list (NPROP) of government owned property used by the Contractor on this Task Order. This support includes preparation and cooperation during property audits.

IV. Government Furnished Facilities, Equipment, Software, and Other Resources

A JWST GS&O IGSS support facility at GSFC B13 provides an IGSS development lab; staff workspace; and space for storage and fabrication.

V. Material Procurement

The Contractor shall propose material that they identify as necessary to perform the work associated with this Task Order.

VI. Travel Support

The Contractor shall propose travel that they identify as necessary to perform the work associated with this Task Order.

Specifically, the Contractor shall support the travel requirements as described in the table below:

Travel Description	Approximate Time Frame
Travel to Northrop Grumman for reviews & delivering/upgrading equipment	5 trips, 1-week/trip
1 trip for IBM rational conference	1 trip, 1-week
Travel to Northrop Grumman and IVV for reviews and meetings related to STS development	3 trips, 3 people, 1-week/trip
Travel to NASA IVV	3 trips, 3 people, 2 days
Travel between STScI and GSFC for IT Security Documentation	4 trips, 1 day/trip
Travel between STScI and GSFC for STScI MOC Plan Assessment	4 trips, 1 day/trip
Travel to necessary IT Security meetings in support of the JWST ISSO	4 trips, 1 day/trip
Travel between STScI and GSFC for IT STS Training	4 trips, 1 day/trip
Travel between STScI and GSFC for A&A support	7 trips, 1 day/trip

VII. Deliverables

The Contractor shall provide the following deliverables in support of the Task Order:

ID	Deliverable Description	Due Date
1	Training (informal demos of IGSS Capabilities)	Within 2 weeks of test completion of a major IGSS software release
2	Verify and map IGSS requirements to specific tests	For up to 6 deliveries per Master Schedule
3	Test Plans and Procedures	For up to 6 deliveries per Master Schedule
4	Test Readiness Reviews	For up to 6 deliveries per Master Schedule
5	Test Reports	For up to 6 deliveries per Master Schedule
6	CMMI Audit Support (Baseline, Functional, Physical)	For up to 6 deliveries per Master Schedule
7	I&T of IGSS refurbished and new units	For up to 6 racks per Master Schedule
8	Fabrication of IGSS refurbished and new units and fabrications supporting SIDU/SITS/IITS; JWST Certification Facility; JSC Labs; and NGAS-IES racks Mod 6 & 9 – Provide additional materials required to support ISIM I&T; JSC; Software Telemetry Simulator. Mod 9 – Provide material required supporting buildup of 6 ICDH-BAE Systems supporting existing JLABs. Mod 10 – Provide material required supporting the RF-PSS. Mod 11 – Provide material required to support: Upgrade of Windows Server 2003 to 2008. Upgrade of ICC workstations. New backup archive server for historical engineering and telemetry data Minimal sparing	For up to 6 racks per Master Schedule For determined JLABs For determined ICC WSs 1 new Server For determined inventory
9	Vendor license and service agreement documentation Mod 11: Minimal license extension as necessary.	Renew 12 licenses prior to their expiration date
10	JWST-IGSS Lab area reconfigurations necessary to support current development & integration	For up to 2 configurations per Master Schedule
11	Final IGSS Architecture Document for "As Built" IITS	Up to 2 updates per Master Schedule
12	Final IGSS External ICD for "As Built" IITS	Up to 2 updates per Master Schedule
13	IGSS Tool Documentation (NGIN Versions)	Up to 2 updates per Master Schedule
14	Documentation regarding material and JLAB sparing for IITS and beyond. Will replace JWST-PLAN-011625 (JWST Project SITS/SIDU Sparing Plan).	Draft Sparing Plan and Final Sparing Plan per Master Schedule

ID	Deliverable Description	Due Date
15	Software Telemetry Simulator (STS) Delivery Package: o Development: Build requirements and list of outstanding requirements o Test: list of defects and suggested enhancements o Documentation: Software Development Plan; Test Plan; User's Manual; Version Description Document (VDD)	Delivery package provided at a minimum of 2 times per year; maximum 5 times per year
16	STS for use by STScI	2 Deliveries
17	IT Security Documentation for JWST STScI: • Draft Combined STScI HST/JWST Moderate Subordinate Security Plan (SSP) • Draft Combined STScI HST/JWST Risk Assessment Report (RAR) & Contingency Plan (CP) • Final SSP, RAR, & CP in Rev 4 of 800-53	Re-phase schedule for these deliverable staying within AFP-6 9/2014 1/31/2015 2/27/2015
18	IT Security Documentation assistance for ISSO including: • System Security Plan (SSP) • Risk Assessment Report (RAR) • Contingency Plan (CP)	Drafts 4/30/2015 Finals 5/30/2015
19	Other Consulting Support findings regarding the review of the STScI JWST Primary MOC Plans	Preliminary review: Comments, questions, requirements provided within 6 weeks of receiving draft MOC plan. Final review: Within 6 weeks of receiving first revision.

End of Task Order Statement of Work

GSMO TASK ORDER

Task No:	**036**
Modification:	7
Task Name:	LADEE Science Operations Center (SOC) Support
Task Period of Performance:	1 March 2012 to 30 September 2014
Modification Period of Performance:	1 June 2014 to 30 September 2014
GSMO SOW Reference:	2.1 Systems Engineering 2.3.1 Facility Engineering 2.3.2 Ground System 2.3.3 Operations Products 2.4 Integration and Test

I. Task Order History

Description of current modification:

Modification 7: Additional scope and extended period of performance for FY14 mission support activities. Only two subtasks shall now remain active. Subtask 1 for general support, engineering, and Science Operations Center decommissioning; and Subtask 3 for product generation (including SPICE and SCLOCK products) and support to the instrument support teams.

Mod #	Start	End	Brief Description
0	3/11/2012	2/28/2013	Initial task order statement of work.
1	5/17/2012	No Change	Add Subtask 3, - Development of LADEE SPICE Attitude and SCLOCK Products
2	6/29/2012	No Change	Replan
3	Upon Award	9/30/2012	Add Subtask 4 for Test Support, 5 for IOC Support
4	10/1/2013	4/30/2014	Add scope and extend period of performance through mission operations phase
5	---	4/30/2014	Add travel, replan
6	---	5/31/2014	No cost extension
7	6/1/2014	9/30/2014	Include post-flight phase, decommission the ops center

II. Background

The Lunar Atmosphere and Dust Environment Explorer (LADEE) mission will orbit the Moon with the primary objective of characterizing the atmosphere lunar dust environment by determining the atmospheric density, composition, and time variability of the fragile lunar atmosphere before it is perturbed by further human activity. In addition to the science objectives, the mission will support the Lunar Laser Communications Demonstration (LLCD). LADEE's expected launch date is Summer 2013 and it is classified as an enhanced "CLASS D" Mission based on factors such as Agency Strategic Plan and National significance.

LADEE's Science Operations Center (SOC) is responsible for centralized payload operations at NASA GSFC and interaction with the payload Instrument Control Centers (IOCs). It will interface with the

NASA Ames Research Center (ARC) Mission Operations Center (MOC) for all data receipt and instrument command uploads and will interface with the IOCs for file exchanges, data archive support, system monitoring, instrument commanding, and schedule coordination. The LADEE SOC will be located in the Science and Planetary Operations Control Center (SPOCC) in Building 32, Room C101C on the GSFC Greenbelt, Maryland campus.

The ARC Mission Operations Center (MOC) is ultimately responsible for all LADEE Mission operations. The LADEE Mission is a 100 day science mission with a 30 day cruise and orbit insertion phase and an approximate 40 day commissioning phase prior to the science phase.

The work associated with this Task Order is supported through multiple funding sources. For this reason, the work and financial reporting should be divided per the following subtasks:

Subtask 1: LADEE SOC System Engineering and Operations

Subtask 2: LADEE STK Visualization Tool - COMPLETED

Subtask 3 - Development and Production of LADEE SPICE Attitude and SCLOCK Products

Subtask 4 – Support of Spacecraft Integration Tests and Mission End-to-End Tests - COMPLETED

Subtask 5 – Support for Instrument Operations Centers - COMPLETED

Subtask 6 – Contingency Operations - COMPLETED

III. Scope of Work

The Contractor shall perform prelaunch Ground Data System (GDS) System Engineering support services in support of the development of the LADEE Science Operations Center (SOC). To successfully support the GDS, the Contractor shall support system engineering activities between the SOC, Mission Operations Center (MOC), and Instrument Operations Centers (IOCs) as related to the SOC Level 4 and Level 5 Requirements. It is intended that the contractor support all LADEE SOC, IOCs, and Major GDS Reviews as feasible.

The Contractor shall also support mission-wide testing, launch preparations, and the SOC operations associated with pre-launch, launch, and on-orbit activities through the period of the task.

The LADEE spacecraft impacted the moon on April 18, 2014. The mission operations phase of the mission has therefore concluded. Remaining work includes the decommissioning of the operations center, the archiving of data records, and generation and delivery of data products, and general support to the mission and science teams.

A. Requirements

A.0. General – Applicable to all subtasks

a) The Contractor shall conform to the LADEE Configuration Management (CM) Process and Procedures.

b) The Contractor shall identify and evaluate SOC and LADEE Mission Risks as necessary.
c) The Contractor shall be responsible for Information Technology (IT) security for all systems operated by the Contractor for NASA or used by the Contractor to connect to a NASA network.
d) The contractor shall submit NASA Technology Reports (NTRs) for all developed software components and shall ensure that Software Use Agreements (SUAs) are in place for all government-provided software.
e) All software developed for mission use shall be developed following CMMI Level 2 or better processes.
f) The Contractor shall ensure availability and competence of the work force necessary to execute the management and technical activities specified in this Task Order. The Contractor shall manage staff allocation to the required tasks described and constrained in this SOW.

A.1 Subtask 1 - LADEE SOC System Engineering

a) The contractor shall serve as a SOC Systems Engineer, supporting all phases of the development of the LADEE SOC, including system requirement definition, system design, system development and maintenance, system testing, and mission operations.
b) The contractor shall support the generation and maintenance of SOC related documentation, such as SOC Level 4/5 requirements, System Interface Control Documentation, the SOC Concept of Operations Document , and all SOC-related Operations Agreements.
c) The Contractor shall support LADEE SOC-specific facility work necessary for the completion of the facility in which the SOC system is hosted. This facility work includes completion of configuration of the network and LADEE SOC computer systems in Building 32, Room C101C. Minor facilities work to the facility common areas shall first be coordinated with the TM.
d) The Contractor shall support LADEE mission meetings, including, as appropriate, Mission Operations Support meetings, Test meetings, Payload meetings, and LLCD meetings.
e) Maintain a "Burn Down" list of SOC-related activities and deliverables remaining to be accomplished prior to launch. The list should be organized to show items, by month, that can be statused on a monthly basis. Key dependencies on others should be shown. The list shall be updated and provided to the government TM at least once per month.
f) The Contractor shall perform routine Science Operations Center operations per the documented support plans. Operational procedures and agreements shall be followed at all times and issues and concerns immediately raised to the LADEE GSFC SOC or Payloads Manager.
g) The contractor shall decommission the LADEE SOC beginning two weeks after the end of the flight phase of the LADEE project. Data archives shall be stored such that retrieval requests can be honored will into the future. Remaining problem report and action items shall be dispositioned, and documentation shall be collected and provided to the Task Monitor. Equipment to be left for future missions shall be cleaned of LADEE-specific materials. The LADEE SPOCC space shall be turned over to the SPOCC facility manager for reassignment.
h) The contractor shall prepare and deliver a bi-weekly Operations Status Summary Report that includes operations support highlights, summary of both standard and contingency operations hours worked, and available metrics reflecting the operations activities supported.
i) Provide support to the LADEE science teams following the flight operations phase of the mission. This includes replying to data access requests, supporting instrument and science team telecons, and hosting science meetings held at GSFC.

Subtask 2 - Development of LADEE STK Visualization System

Effort concluded prior to launch.

Subtask 3 - Development and Production of LADEE SPICE Attitude and SCLOCK Products

a) The contractor shall serve as the System Engineer for the development of the LADEE Mission SPICE Attitude Kernel, the SPICE Clock Kernel, the Frames Kernal, as well as ground based clock correction procedures. Work shall include interface coordination with the LADEE systems engineering team, development of the tools, testing of the tools and the products generated
b) The contractor shall generate, validate, quality check, and distribute the operational products to the NAIF and PDS for the life of the mission.

Subtask 4 – Support of LADEE I&T Testing and End-to-End Testing

Effort concluded prior to launch.

Subtask 5 – Support to the LADEE Instrument Control Centers

Activities ended at the end of the flight operations phase. General support moved to Subtask 1.

Subtask 6 – Contingency Operations

Effort concluded at the end of the flight operations phase.

B. Management Reporting

The Contractor shall provide monthly status reports and reviews on the technical, cost, schedule and operational performance in accordance with the WBS to adequately describe the activities of the task to the Task Monitor.

C. Contractor Controlled Property

The Contractor shall assist the GSMO contract managers and property custodians in maintaining the overall list (NPROP) of government owned property used by the Contractor on this Task Order and to support the orderly transfer of equipment as the operations center is decommissioned. This support includes preparation and cooperation during property audits.

IV. Government Furnished Facilities, Equipment, Software, and Other Resources

Government furnished facilities, equipment, software and other resources include the following:

(1) LADEE SOC facility, located in Bldg 32, Room C101C,
(2) LADEE SOC computing equipment and software, except where such is still to be developed under this task.
(3) LADEE SOC network connections.

Note that the contractor is required to work with the TM to ensure that proper Software Use Agreements are in place to allow for contractor access and use of the government-provided software.

V. Material Procurement

Material procurements under subtask 1 may be required throughout the period of this task. Examples include, but are not limited to, storage drives and media for the mission and science data products.

The Contractor shall propose materials, either specifically or as general categories that they identify as necessary to perform the work associated with this Task Order. The Task Monitor shall concur with the materials list prior to procurement.

VI. Travel Support

The Contractor shall propose travel that they identify as necessary to perform the work associated with this Task Order. No planned meetings, training, or reviews are currently identified which will require travel.

VII. Deliverables

The Contractor shall provide the following deliverables in support of the Task Order:

ID	Deliverable Description	SUBTASK	Due Date
	Status Summary Report	1	Bi-weekly
	Complete decommissioning of the SOC	1	July 2014
	Deliver all remaining SOC documents, products and archives to Task Monitor	1	September 2014

	Deliver copies of the data archives to the IOC teams.	1	September 2014
	PDS Deliveries	3	June, August 2014
	End of Task Report	1	September 2014

End of Task Order Statement of Work

SN Ground Segment Sustainment (SGSS) Project Support
GSMO Task 37 Mod 12 Statement of Work

GSFC Task Monitor: **Vir Thanvi**

Task Period of Performance: 03/01/2012 – 07/31/2016
Mod 12 Period of Performance: 08/01/2015 – 07/31/2016

I. Task Order History

Description of current modification (Modification 12): The purpose of this modification is to extend the period of performance as well as increase the level of support in the areas of Systems Engineering, Element Engineering and COMSEC Support. This modification also adds scope to support Consultative Committee for Space Data Systems (CCSDS) Cross Support Service Management effort

Mod #	Start	End	Brief Description
0	03/01/2012	02/28/2013	Initial task order statement of work.
1	04/01/2012	09/30/2012	Increase level of FGM support and add Project Mgmt Office Planning and Analysis support
2	04/01/2012	09/30/2012	Re-planning
3	04/01/2012	09/30/2012	Administrative
4	11/1/2012	09/30/2013	Add I&T Support, extend period of performance, de-scope EI element lead
5	7/1/2013	09/30/2013	Increased support for SOW Section 5 (SGSS PMO Support) in developing program status presentation/cost review.
6	10/1/2013	09/30/2014	Extend period of performance, de-scope COMSEC support, de-scope customer outreach support, add WSC HVAC A&E, add WSC electrical design change review
7	01/24/2014	09/30/2014	Re-planning
8	05/27/2014	09/30/2014	Added short-term COMSEC testing support and some additional re-planning
9	10/01/2014	09/30/2015	Extend period of performance, de-scope WSC HVAC and Electrical Design, added section on Deployment, Transition, and Operations, and editorial updates to align with project phase.
10	10/01/2014	09/30/2015	Administrative
11	05/18/2015	09/30/2015	Increase level of support, add WSC/GRGT Electrical Mods scope
12	08/01/2015	07/31/2016	Extend the period of performance; increase the level of support in the areas of Systems Engineering, Element Engineering, and COMSEC Support; support CCSDS Cross Support Service Management.

II. Background

The purpose of the SN Ground Segment Sustainment (SGSS) Project is to implement a modern ground segment that will enable the SN to continue to deliver high quality services to the SN community, meet stakeholder requirements, and significantly reduce required operations and maintenance resources. This effort will address obsolescence of the existing systems, create a more flexible and expandable architecture, address evolving customer requirements and advances in technology, implement new methods and capabilities for using the TDRS to support customer spacecraft, expand and improve the methods by which the customer control centers interface with the SNGS for data and service planning and control, and maintain long-term operational performance, reliability and maintainability.

An Implementation Contractor has been selected to develop the new SN ground segment. The support outlined in this SOW will involve systems engineering, integration and test, along with oversight of and insight into the Implementation Contractor's engineering activities.

III. Scope of Work

The Contractor shall provide technical expertise in support of SGSS systems engineering and element engineering as well as support the project in oversight of implementation contractor's design, development, integration and testing activities.

A. Requirements

The following sections provide details regarding the work the contractor shall perform under this task.

1. **General Systems Engineering and Element Engineering Support**
    a. Support various engineering analyses and trade studies
    b. Participate in various engineering peer reviews, system reviews, regularly scheduled and ad-hoc Technical Interchange Meetings
    c. Review test plans, procedures, and reports for unit, subsystem, and element level I&T
    d. Support reviews of CDRL and non-CDRL documents as a subject matter expert
    e. Monitor the Implementation Contractor's (IC's) plans, schedules, and status and provide inputs to the SGSS Project
    f. Evaluate the IC's plans and designs, ensuring the element design meets lower level requirements and specs
    g. For personnel not acting in the lead role, submit weekly status to the element lead
    h. Support system engineering team in requirements, interface, and test tracking
    i. Support the Deployment and Transition team on activities related to elements
    j. Support the efforts by the IC on verification of lower-level requirements, providing clarification on system requirements as needed. Ensure the lower level requirements comply with the intent of the Level 3 requirements

2. **System Integration and Test Support Services**
    a. Support oversight of IC I&T detailed planning activities

b. Review verification criteria for system requirements
c. Review system test plans and procedures
d. Support reviews of CDRL and non-CDRL I&T documents as a subject matter expert
e. Monitor the IC's I&T plans, schedules, status and reports, and provide inputs to the SGSS Project
f. Participate in various I&T peer reviews, system reviews, and Technical Interchange Meetings
g. Witness system level I&T activities at IC and subcontractor sites
h. Review discrepancy reports, and monitor progress of discrepancy resolutions.

3. SGSS PMO Support

a. Provide program-planning services to the Project Office in support of forthcoming executive-level reviews. The contractor shall engage existing SGSS project staff to gather relevant program status information and shall support NASA in developing program status presentations articulating program progress against milestone objectives, risks, anticipated costs, and so forth as per agency and center directives, guidelines, and procedures.

4. COMSEC Testing Support

a. Support the project COMSEC Engineer in evaluating technical interfaces for testing the operational Cryptographic Algorithms and Keys of the KS-252.
b. Support the COMSEC testing technical interchange meetings at White Sands Ground Terminal to discuss testing consolidation and cost reduction opportunities of additional COMSEC testing.
c. Evaluate test equipment availability and associated interfaces to aid further test planning including configuration options associated with equipment, interfaces, and software scripts.
d. Develop COMSEC KS-252 Engineering Change Requests for deployment of the KS-252 COMSEC service racks to the SN ground terminals, perform cryptographic regression unit level testing of the KS-252, and provide support to implementation contractor team during system level integration and testing

5. Deployment, Transition, and Operations Support

a. [redacted]
b. Assist the DTO manager in monitoring the IC's DTO activities.
c. Review IC's DTO plans and procedures.
d. Assist DTO manager in planning and managing the DTO activities on the project including preparations of executive briefings, review of CDRL and non-CDRL documents, etc.

6. WSC/GRGT Electrical Mods

a. Design for STGT, WSGT, and GRGT Electrical Modifications to meet SGSS Installation Requirements
    i. The SGSS design will require electrical drawings showing the distribution of power to the Power Distribution Racks (PDR), 225A/208V/3-phase to be used in all areas that SGSS equipment is going to be installed
    ii. The contractor shall provide an Architect and Engineering (A&E) design to include Statement of Work, [redacted] Schedule, and Drawing package

ready for procurement for this task. The contractor may propose changes to the deliverables (content, due dates, new deliverable items).

iii. The contractor shall provide Electrical Engineer P.E. to review proposed electrical distribution changes to ensure fault coordination is maintained and incorporate changes if not met.

iv. Reviews Required (review dates to be proposed by the contractor):
    1. System Requirements Review
    2. Preliminary Design Review
    3. Final Design Package Review

7. **CCSDS Cross Support Service Management Support**
    a. Support development of international space data standards to promote interoperability and cross support amongst cooperating space agencies enabling multi-agency spaceflight collaboration and new capability for future missions
    b. Provide technical expertise in the discipline of Service Management
    c. Participate and support CCSDS technical working group – Cross Support Service Management
    d. Support development of international space standards, which address arranging, scheduling, controlling, and monitoring Telemetry, Tracking, and Commanding services
    e. All effort towards CCSDS Support should be tracked and reported under a separate sub-task.

B. Management Reporting

The Contractor shall provide monthly status reports and reviews on the technical, cost, schedule and operational performance in accordance with the WBS to adequately describe the activities of the task to the Task Monitor.

C. Contractor Controlled Property

The Contractor shall assist the GSMO contract managers and property custodians in maintaining the overall list (NPROP) of government owned property used by the Contractor on this Task Order. This support includes preparation and cooperation during property audits.

IV. Government Furnished Facilities, Equipment, Software, and Other Resources

There are no Government furnished facilities, equipment, or software associated with this Task Order except for office spaces and ACES provided equipment.

V. Material Procurement

The Contractor shall propose material that they identify as necessary to perform the work associated with this Task Order.

VI. Travel Support

The Contractor shall propose travel that they identify as necessary to perform the work associated with this Task Order.

Specifically, the contractor shall support the travel requirements as described in the table below:

Travel Description	Approximate Travel
	CY4-5
Reviews and Technical Interchange Meetings at IC facilities and IC subcontractor facilities	12 trips to Scottsdale, AZ [redacted] 6 trips to Melbourne, FL [redacted]
SN facilities	4 trips to Las Cruces, NM [redacted]
I&T Surveillance at IC and IC subcontractor facilities	As directed
COMSEC Testing Support and associated TIMs at SN facility	2 trips to Las Cruces, NM [redacted]
CCSDS Support	1 trip to Darmstadt, Germany (Nov 2015) [redacted] 1 trip to Ohio, USA [redacted]

VII. Deliverables

The Contractor shall provide the following deliverables in support of the Task Order:

ID	Deliverable Description	Due Date
1	Review of IC CDRL and non-CDRL items	As directed
2	Status reports	Monthly

End of Task Order Statement of Work

GSMO TASK ORDER

Task No:	**38**
Modification:	5
Task Name:	**SOHO Mission Operations**
Task Period of Performance:	3/1/2012 to 1/31/16
Modification Period of Performance:	2/1/15 to 1/31/16
GSMO SOW Reference:	3: 3.1 – 3.7

I. Task Order History

Description of current modification (Modification 5): This modification to the statement of work for SOHO Mission Operations task is to extend the period of performance extension, MOC upgrade.

Mod #	Start	End	Brief Description
0	03/01/2012	02/28/2013	Initial task order statement of work.
1	09/04/2012		Change Task Monitor
2	03/01/2013	02/28/2014	Period of performance extension
3	09/23/2013	02/28/2014	Hardware upgrade of MOC operational strings
4	3/01/14	01/31/15	Period of performance extension, hardware upgrade, SLE SW mod, Attitude enhancement delivery
5	2/1/15	1/31/16	Period of performance extension, MOC upgrade

II. Background

The SOHO mission is a high-capability (11 instruments), low-risk mission. It is distinguished by requirements for very high data capture (100% goal, 96% required) and high real time contact time (100% for 2 months, 80% for 10 months/year), including approximately 10 hours of real time instrument commanding by up to six of the Principal Investigator (PI) teams from the Experimenters Operations Facility (EOF).

Mission operations are conducted from GSFC utilizing NASA institutional and project-unique support facilities. These facilities provide science planning and operations, control center operations, attitude and orbit computation, mission analysis, communications, simulations, and data capture and processing. Command uplink, telemetry acquisition, and metric tracking are through the DSN.

III. Scope of Work

The Contractor shall provide mission operations for the SOHO mission.

A. Requirements

A.1 Spacecraft Operations

The contractor shall

- perform all real-time operations of the SOHO spacecraft including:

- telemetry, tracking and command activities,
- health and safety monitoring,
- orbital and/or attitude maintenance maneuvers,
- system configuration,
- housekeeping telemetry processing,
- command load uplink and verification,
- onboard table and memory load/dump operations,
- management of the Solid State Recorder (SSR) and the Tape Recorder (TR) to capture and downlink all science and spacecraft engineering data.

- perform all real time support operations including:
  - planning and scheduling,
    - schedule DSN resources
    - schedule the European Space Agency tracking resources (New Norcia) to support holes in DSN coverage
  - stored command load generation,
  - maneuver planning, and
  - spacecraft clock maintenance.
- perform attitude operations for the SOHO mission including:
  - attitude determination,
  - attitude sensor calibration and trending,
  - attitude product generation,
  - attitude maneuver planning and execution
  - document all nominal and contingency attitude operations procedures
  - add workstation to host the SOHO attitude determination system in the MOC
    - configure and test for operations
- monitor the spacecraft to prevent or detect spacecraft anomalies, and respond appropriately
  - monitoring shall provide:
    - sufficient warning to avoid anomalies caused by slow degradation
    - sufficient indicators to detect, as quickly as possible, anomalies that do occur.
  - The contractor shall respond to any single failure within 24 hours (assuming Hx momentum of at least –10 Nms)
  - The contractor shall respond to any failure triggered during thruster operations within 8 hours
- perform daily subsystem operations including:

  - Reaction wheel speed limit updates
  - CRS drift term update
  - Updating CELIAS and SWAN OBT
  - Clock correlation checks
  - SSR operations (dump/record)
  - RF trending data collection
- perform semi-routine (few times per week) subsystem operations including:
  - Uploading new HGA nominal control table
  - Uploading new Roll Steering Law table
  - Selecting new guide star
  - Acquiring new tracking stars
  - Dumping flight software maintenance parameters
  - Updating ACU Hx limits
  - Switching from CAE A to B and B to A
  - Updating UVCS LOBT
  - Uploading new non-coherent (NONCOHO) commands
- perform special (> once per month) subsystem operations including:
  - Keyhole operations
  - Reaction Wheel Momentum Management as required
  - Station keeping Maneuvers as required
  - Roll Profile
  - Pitch or yaw off pointings for instrument calibration as requested by the instrument teams.
  - Adjusting OBT clock frequency
  - Dumping CDMU and ACU memory (RAM) every other month
  - Tape Recorder Maintenance every other keyhole period
  - Software patch uplink and testing
- maintain a training plan to ensure crew and staff engineer proficiency.
- continue to develop and modify automated procedures and tools required to efficiently support the Bogart phase of the mission.

A.2 Data Processing

The contractor shall

- provide level zero processing of all observatory and science data
- ensure delivery goals are met
- perform data analysis for anomalous data

- interact with customers from EOF, EAF, CDHF and Stanford University.

A.3 System Administration

The contractor shall:

- maintain network software configurations on hosts and Local Area Network (LAN) routers
- maintain compliance with NASA IT Security Policies and Guidance.
- maintain complete documentation and strict configuration management of all operational system builds (from initial re-format to operational certification).
- perform database administration to ensure the integrity and availability of database systems and their content.

A.4 Sustaining Engineering

The contractor shall:

- provide all systems support, including updates, for the MOC and external interface changes and associated vendor licenses.
  - software Sustaining Engineering/Enhancements
    - arrange vendor maintenance agreements for Commercial Off-the-Shelf (COTS) products
    - corrective maintenance of operational custom software systems
    - modifications to existing operational custom software systems
    - test and integration support of new or modified software
    - documenting software problems and changes
    - maintenance of operational parameter databases
    - configuration control of software system configurations
  - hardware Maintenance and Sustaining Engineering/Enhancement
    - respond to hardware malfunctions within 1 business day unless a subsequent failure would directly impact mission health and safety
    - support around the clock maintenance for brief periods during critical mission activities
    - provide stand by support as required during mission simulations, ground system tests, critical on-orbit activities, or in response to anomalies
  - recommend alternative solutions in anticipation of hardware and software obsolescence
- provide support for the Experimenters Operations Facility (EOF) Core System (ECS) software
- support the SOHO simulator as required
- investigate the feasibility of using Automatic Retranslation and Integrated Environment Simulation (ARIES) for porting of various SOHO software systems
- participate in any ground system re-engineering activities
- be exempt from CMMI
- PTI support
- SLE OS upgrade
- Historical data transfer from RDA to RAID

A.5 Configuration Management (CM)

The contractor shall:

- establish and administer a Configuration Control Board (CCB) to review and approve changes to the configuration of deliverable items.
- create and maintain documentation of the baseline of hardware, software, facilities, and support interfaces for operational systems that indicates models, versions, releases, and vendor support availability for each system and facility identified and consistent with IT Security guidance for certification and auditing.
- create and maintain a full and complete written record of configuration changes to all deliverable items.

A.6 Risk Management and Best Practices

The contractor shall:

- identify and evaluate risks to operational systems that support the missions, including risk of software and hardware obsolescence and IT Security vulnerabilities

A.7 End-of-Life Plan

The contractor shall provide required updates and support to ESA SOHO End-of-Life (EOL) Plan as needed.

A.8 Flight Operations Mission Library

The contractor shall maintain a library of operational documentation. The library includes but is not limited to:

- Flight Operations Plan
- SOHO User's Manual
- Ground system user's guides
- Logbooks (since launch)
- Operation Change Directives (OCDs) (since launch)
- Spacecraft and ground anomaly reports (since launch)

B. Management Reporting

The Contractor shall provide monthly status reports and reviews on the technical, cost, schedule and operational performance in accordance with the WBS to adequately describe the activities of the task to the Task Monitor.

The contractor shall provide a weekly status report by close of business each Wednesday. The report shall include a summary of operations for the last week and a list of upcoming events for the next two weeks.

The contractor shall provide a monthly financial status summary (533 statement). Delivery for any given month shall be by the 15th of the following month.

C. Contractor Controlled Property

The Contractor shall assist the GSMO contract managers and property custodians in maintaining the overall list (NPROP) of government owned property used by the Contractor on this Task Order. This support includes preparation and cooperation during property audits.

IV. Government Furnished Facilities, Equipment, Software, and Other Resources

All SOHO mission operations facilities will be provided for this task.

All GSMO tagged and installation-provided GFE currently located at GSFC will be made available for the performance of this task. All property required to perform this task is currently identified in the GSMO Property Database.

V. Material Procurement

The Contractor shall propose material that they identify as necessary to perform the work associated with this Task Order.

VI. Travel Support

The Contractor shall propose travel that they identify as necessary to perform the work associated with this Task Order.

Specifically, the contractor shall support the travel requirements as described in the table below:

Travel Description	Approximate Time Frame
NONE	

VII. Deliverables

The Contractor shall provide the following deliverables in support of the Task Order:

ID	Deliverable Description	Due Date
1	Anomaly Reports including ground, spacecraft and	Within 1 business

	database	day of anomaly occurrence
2	Monthly metrics reports covering the complete mission	15th of the following month
3	Ground system test reports for all new software releases for all ground systems	After completion of acceptance testing
4	Flight Operations Plan including mission requirements, implementation of requirements, description of operational processes, description of ground system, overview of spacecraft design, description of anomaly detection & response and a mission management plan for SOHO operations	Updated as required. Mission Management plan for task order delivered 25 days after contract award
5	Nominal Operations Scripts for nominal, semi-routine or special operations including detailed stop-by-step instructions, constraints and abort/contingency criteria	Updated as required.
6	Contingency Scripts with a description of each known contingency, detailed step-by-step instructions, constraints, and abort/contingency criteria	Updated as required.
7	Training Plan with a description of training for SOHO operations and including recurring training for proficiency	Updated as required
8	Change Requests using the SOHO Programme Office form showing the end-to-end process for any changes to operational products or ground systems	Generated for all changes to operational products and ground system configuration.
9	Risk Forms detailing risks to the mission	Generated as risks are identified
10	Semi-routine/special operations planning reports including a timeline for the activity, the DSN schedule, status of operational products and operational readiness	Prior to activity at Special Operations Readiness Review (SORR)
11	End of Life Plan including the description of activities to close out the mission	Updated as Required
12	Anomaly closeout report including a summary of ground anomaly closures	Weekly
13	Operational Products including TSTOL procedures, TSTOL configuration monitor flies, TSTOL pages, C-shell and PERL scripts and other products	Updated as required, all changes under configuration control
14	Trending data as defined by ESA	Monthly
15	Special trending requests	As requested
16	Project Database containing limit information	Updated as required
17	Daily Reports including a summary of all activities for each mission day	Within 7 business days
18	Logbooks including the operations, OE, CMS offline string and simulator logbooks	Updated as activities take place.
19	Data Processing products including	

	- VC01 routine products (24 hr product) - VIRGO routine product (24 hr product) - MDI-VC2 or 3 routine product (automatic per file) - MUX routine product (24 hr product) - Trending routine product (24 hr product)	2 wk delivery goal 2 wk delivery goal 4 day delivery goal 2 wk delivery goal 2 wk delivery goal
20	Financial Reports including the 533M and 533 Q	As dictated by the contract
21	Project Schedule including the status of work packages and their major sub-elements	Presented as required
22	Software & Documentation as dictated by individual work packages including executable and source code, media, documentation, etc as negotiated within the individual work package	As required, delivered to the MSL in bldg 3
23	CM Baseline including an accurate account of hardware, software, facilities and support interfaces for operational systems that indicate models, versions, releases and vendor support availability for each system and facility identified	Maintained continually per CM process
24	Final Mission Report	End of Task Order POP
	MOC Hardware Upgrade Deliverables	
U.1	Weekly status reports	Starting 10/7/2013
U.2	The completed new prototype string (system)	3/31/2014
U.3	Written results of the string replacement prototype test	3/31/2014
U.4	Final report on the prototype implementation	3/31/2014
U.5	SLE OS upgrade	06/30/2014

End of Task Order Statement of Work

GSMO TASK ORDER

Task No:	**039**
Modification:	4
Task Name:	EOS Flight Operations
Task Period of Performance:	03/01/2012 to 02/29/2016
Modification Period of Performance:	03/01/2015 to 02/29/2016
GSMO SOW Reference:	3.3, 3.4, 3.6, 3.7

I. Task Order History

Description of current modification (Modification 4): This is a modification to the existing EOS Flight Operations task to extend the period of performance 12-months to 02/29/2016. The revised period of performance is expected to start 03/01/2015.

Mod #	Start	End	Brief Description
0	03/01/2012	02/28/2013	Initial task order statement of work.
1	03/01/2013	02/28/2014	Extend period of performance through 2/28/2014.
2	03/18/2013		Administrative
3	03/01/2014	02/28/2015	Extend period of performance through 2/28/2015
4	03/01/2015	02/29/2016	Extend period of performance through 2/28/2016 And added the need to access Subject Matter Experts in Operational Collision Avoidance (OCA)

II. Background

The GSFC's Earth Science Mission Operations (ESMO) Project (GSFC Code 428) is responsible for ground system and mission operations support services for the Earth Observing System (EOS) Terra, Aqua and Aura missions.

The ESMO Mission Director will provide technical leadership for all mission operations activities, and will be the Task Monitor. All issues, technical, financial and administrative, related to this task shall be coordinated with the Task Manager.

The Contractor shall perform ground systems and mission operations of the EOS Terra, Aqua and Aura spacecraft. Mission operations for the EOS missions include flight operations, flight dynamics support, flight software maintenance support, and data operations.

Based on recent experience with planning Debris Avoidance Maneuvers (DAMs) for the EOS satellites, where multiple predicted close approaches over a relatively short period of time need to be considered, there are opportunities to significantly improve the response time and decrease the workload by having access to subject matter experts in Operational Collision Avoidance (OCA).

The Contractor shall perform flight operations and data operations on an around-the-clock, 7-days-per-week basis unless directed otherwise by the ESMO Mission Director via a modification.

III. Scope of Work

The Contractor shall perform flight operations of the EOS Terra, Aqua and Aura spacecraft consistent with established procedures, other sections of this Task Statement of Work (SOW) and the Ground Systems and Mission Operations (GSMO) SOW Sections 3.3, 3.4, 3.6 and 3.7, as

applicable. Flight operations includes all activities necessary to maintain spacecraft and instrument health and safety while working to achieve the objectives of the mission, provide daily operational continuity and perform on-going monitoring and analysis of onboard and ground systems. The contractor shall perform spacecraft engineering analysis and operations engineering analysis, as necessary. Planning, rehearsal, execution and post-event analysis will also be performed for special events such as orbital maneuvers and infrequent activities (e.g. spacecraft engineering tests and instrument calibration activities). The Contractor shall be responsible for the planning, rehearsal, execution and evaluation of contingency operations through its EOS Flight Operations Team (FOT) and the ESMO provided Anomaly Recovery Team (ART) described below.

The EOS Terra mission entered into its Extended Mission Operations phase in December of 2005. Engineering changes to the EOS Terra ground system being implemented under other tasks that are scheduled for completion in FY16, will result in operational efficiencies that may allow the FOT to reduce the on-line level-of-effort. Reductions to EOS Terra on-line operations are dependent on the successful implementation of automation enhancements that will allow night shift Terra operations for spacecraft health and safety monitoring and Solid State Recorder (SSR) management to be automated.

The EOS Aqua mission entered into its Extended Mission Operations phase in September 2008 and the EOS Aura mission entered its Extended Mission Operations phase in October 2010.

In preparation for the 2013 NASA HQ Mission Extension Senior Review Proposal cycle, the contractor developed an EOS Automation Operations Concept that takes advantage of economy-of-scale efficiencies of operating the two nearly identical Aqua and Aura spacecraft busses, and automation initiatives that are implemented under other tasks for the EOS Terra, Aqua and Aura ground systems and/or flight systems to enable reductions in operations costs for all three EOS missions.

The Contractor shall support the ESMO ground system upgrades and technology refresh activities that are being implemented under the ESMO Automation Plan (EAP) for EOS Terra, Aqua and Aura. These ground system upgrades and technology refresh activities are being implemented under separate tasks that are scheduled for completion in FY16/FY17 timeframe. The Contractor shall participate in and provide support to all development lifecycle activities related to the EAP. The contractor shall provide support for the Back-up EOS Operations Center (BEOC) as required to sustain continuous flight operations of the EOS missions.

The contractor shall provide subject matter expertise in the area of operational collision avoidance risk management. Technical support that shall be provided includes; analysis and evaluation of close approach warning messages, optimum avoidance maneuver planning, and offline analysis as required. Additional technical support shall be provided to ESMO Project Management and ESMO Mission Directors in the areas of decision aid interpretation and course of action strategies.

A. Requirements

A.1. Management Approach

The Contractor shall provide mission management support necessary to ensure staff availability, competence, reliability, performance, and reporting of the work force required to operate the EOS spacecraft and their associated ground system elements. The Contractor shall perform technical management of the EOS Operations Center (EOC)

that's utilized to conduct EOS flight operations. Technical management activities shall include, but not be limited to, the following functions:

- Coordinate with Task Monitor for EOC operations scheduling, budgeting, and staffing.
- Plan, manage, and coordinate EOC operations and operations related functions specified within this task. This includes ensuring that spacecraft operations meet the requirements of this SOW, and includes performing appropriate staffing, scheduling, and budget planning activities.
- Coordinate configuration tracking for all mission operations changes with the ESMO Mission Director.
- Participate in engineering studies and recommend system and procedural (hardware/software upgrades, staffing adjustments, procedure modifications, facility enhancement, etc) changes to meet future mission requirements and/or improve ongoing operations.
- Maintain awareness of EOS Data Operations System (EDOS) development and maintenance activities. The Contractor shall coordinate with EDOS and the Science Interface Manager any flight operations activities, proposed concepts, and plans that impact EDOS data capture or processing and/or science team data products (for example, the SSR automation concept and plan).
- Participate in all ESMO Discrepancy Review (DR) Board and Project Configuration Management Board (PCMB) Meetings. Provide analysis and impacts on Discrepancy Reports (DRs) and Configuration Change Requests (CCRs) as requested by the ESMO Mission Director.
- Participate in Anomaly Review Boards and other regular activities related to spacecraft operations.

A.1.1 Staff Allocation, Expertise, and Level of Effort

EOS Flight Operations activities require expertise in on-console operations, spacecraft engineering data analysis, programming of operations scripts and reporting. The contractor shall provide the proper staffing levels to safely and effectively operate the EOS missions.

A.1.2 Management Reporting

The Contractor shall provide monthly status reports and reviews on the technical, cost, schedule and operational performance to adequately describe the EOS mission operations and mission support services activities that were provided to the ESMO Project.

The Contractor shall provide monthly financial reporting by mission and by combined total task. Reporting will provide 533M level information by mission (Terra, Aqua and Aura) and contain sufficient detail to allow long-term budget planning.

The Contractor shall provide an annual performance review of the EOS mission operations and mission support services based on current requirements and actual services used. The Contractor shall present to the Government an operations concept for the next year considering the EOS mission's current status, expected budget, and risk tolerance.

All reports shall be made available in both softcopy and hardcopy if requested.

A.1.3 Risk Management and Best Practices

The Contractor shall apply continuous Risk Management and Best Practices compliant with NPG 7120.5. In addition, the Contractor shall comply with all Agency, Center, and ESMO directives regarding Risk Management and Best Practices.

A.1.4 Information Technology Security

The Contractor shall apply Information Technology (IT) security standards as defined by NPG 2810.1 for systems classified as Mission (MSN) for all ESMO IT systems. In addition, the Contractor shall comply with all Federal Rules and Regulations and Agency/ESMO directives. The EOS EOC is classified as an MSN system.

A.1.5 Organizational Interfaces

The Contractor shall interface with all EOC service providers, and customers as specified in the Operations procedures, Interface Control Documents (ICDs) and Operations Agreements (OAs).

The Contractor shall also interface with GSFC Security Office as required.

A.2. Technical Approach

A.2.1 Spacecraft Operations

A.2.1.1 Coordination with other Missions

Coordination with the Afternoon Constellation: The Contractor shall notify all member satellites of the "A-Train" Afternoon Constellation of any and all instances of the Aqua and/or Aura spacecraft transitioning into or out of Safe or Survival Mode. Notification shall be in accordance with Interface Control Documents and Operations Agreements between the member satellites of the "A-Train" Afternoon Constellation and the ESMO Project.

Coordination with Terra and the Morning Constellation Satellites: The Contractor shall notify all member satellites of the Morning Constellation and the A-Train Afternoon Constellation of any and all instances of the Terra spacecraft transitioning into or out of Safe or Survival Mode. Notification shall be in accordance with the Constellation agreement documents between the member satellites of the Morning Constellation and/or A-Train Afternoon Constellation and the ESMO Project.

Coordination of Non-nominal and/or Special Instrument Activities: The Contractor shall inform the ESMO Mission Director and ESMO Science Interface Manager regarding any instrument team request to perform special or non-nominal activities. The Contractor shall support instrument teams in testing and checking of new or modified procedures. Simulations shall be performed to the extent possible prior to the uplink of any new commands/procedures. Any activity requiring the concurrence of the instrument teams and/or Project Scientists shall

be coordinated with the ESMO Science Interface Manager and ESMO Mission Director.

Coordination with External Users and/or Science Teams: The Contractor shall inform the ESMO Science Interface Manager and the ESMO Mission Director regarding any condition or activity that impact external users and/or the EOS Science Teams, for example, the Direct Broadcast users.

A.2.1.2 Planning and Scheduling

The Contractor shall secure adequate communications services through the Ground Network (GN) and Space Network (SN), or other government provided communications networks for the delivery of spacecraft and instrument telemetry to the ground and the commanding and tracking of the Terra, Aqua and Aura spacecraft.

The Contractor shall ensure a conflict-free schedule of activities for all spacecraft contacts, spacecraft activities, and instrument operations that is consistent with the overall Terra, Aqua and Aura mission operations requirements

A.2.1.3 Real-time and Support Operations

The Contractor shall support all real-time operations of the Terra, Aqua and Aura spacecraft from both ground and space networks, as necessary to meet mission objectives. Real-time operations consist of those activities that are necessary to support direct communication with the spacecraft and include: telemetry, tracking and command activities, health and safety monitoring, orbital maintenance maneuvers, system configuration, housekeeping telemetry processing, command load uplink and verification, onboard controller table and memory load/dump operations, and management of the Solid State Recorder (SSR) to capture and downlink all science and spacecraft engineering data. Support operations are those offline activities that are necessary to support the safe and nominal operation of the spacecraft and include: planning and scheduling, stored command load generation, ephemeris generation, maneuver planning support, spacecraft clock maintenance, and S-Band center frequency maintenance.

A.2.3.4 Support of EOS Flight Dynamics System (FDS) Functions

The Contractor provided Flight Operations Team (FOT) shall work closely with the Flight Dynamics System Services (FDSS) contractor team to plan, coordinate and execute all EOS spacecraft orbit maintenance and attitude maneuvers. The FDSS contractor shall plan all maneuvers, and the FOT contractor shall coordinate and execute all maneuvers.

The Contractor shall coordinate and communicate all Aqua and Aura orbit maintenance maneuvers with the other satellites of the "A-Train" Afternoon Constellation at least 1-week prior to any such maneuver. Notification shall also be provided within 1-hour after successful completion or postponement of all orbit maintenance maneuvers.

The Contractor shall participate in all "A-Train" Afternoon Constellation Working Group Meetings as requested by the ESMO Mission Director or the ESMO Constellation Team Manager. Participation may be via teleconference or may require travel to the Afternoon Constellation Mission Operations Working Group (MOWG) Meeting at the request of the ESMO Mission Director or the ESMO Constellation Team Manager.

A.2.3.5 Support of Operational Collision Avoidance Activities

The contractor shall utilize contractor provided tools to develop a planned course of action for conjunctions where multiple predicted close approaches over a relatively short period of time need to be considered. For such events, the contractor shall recommend a course of action.

The contractor shall help the FOT and ESMO mission management personnel to establish and understand operational risk for a given conjunction event.

The contractor shall work with the FOT during the maneuver planning phase to help establish and mitigate collision risks.

The contractor shall work with the FOT to enable better understanding of the NASA Conjunction Assessment and Risk Analysis (CARA) conjunction assessment screening reports.

The contractor shall review the current ESMO collision avoidance risk evaluation procedures and provide recommended improvements where necessary.

The contractor shall review current ESMO maneuver planning and execution procedures.

The contractor shall present recent experience and lessons learned at Earth Science Constellation (ESC)/Afternoon Constellation (a.k.a. "A-Train) Mission Operations Working Group (MOWG) Meetings and other technical meetings dealing with collision avoidance risk management as directed by the ESMO Project.

The contractor shall provide, via a subscription service, persistent access to an online collaboration environment to analyze conjunction data. Access shall be for the following ESC missions: EOS Terra, Aqua, and Aura

A.2.2 Spacecraft Engineering

The Contractor shall provide a dedicated staff of experts to monitor and maintain the health of the Terra, Aqua and Aura spacecraft, collect telemetry data and process all health and status telemetry data to assess the performance of each spacecraft subsystem and instrument. The off-line engineering staff shall be the technical leadership of the Flight Operations Team and shall be responsible for ensuring all aspects of spacecraft performance.

A.2.2.1 Anomaly Detection, Isolation, Analysis, Recovery and Reporting

The Contractor shall monitor and maintain the health of the Terra, Aqua and Aura spacecraft, collect telemetry data and process all health and status telemetry data to assess the performance of each spacecraft subsystem and instrument.

In response to spacecraft anomalies the Contractor shall execute the pre-approved red-limit responses such as flight operations procedures and/or spacecraft commands. In response to spacecraft anomalies that do not have a pre-approved response and the spacecraft is not in imminent danger of loss of mission, the Contractor shall defer sending corrective action spacecraft commands without the approval of the appropriate ESMO Mission Director. The ESMO Mission Director shall direct the Contractor to conduct anomaly investigations as needed to assess on-orbit problems and formulate a response using the appropriate expertise.

An anomaly is defined as the occurrence of any event that causes the spacecraft, its instruments, or any of the ground-based support systems to perform in a non-standard manner during any normal or special operation. An anomaly may occur in either on-orbit or ground-based elements of the EOS mission operations system. The Contractor shall be responsible for support of anomaly resolution activities as defined in this section.

The Contractor shall report all anomalies that occur to the spacecraft, the instruments, the mission operations facilities, or other areas that impact the operation or safety of personnel and equipment. The anomaly report shall be in accordance with NASA/GSFC's Code 400 Flight Programs and Projects Directorate Anomaly Notification Procedures and Guidelines and ESMO's Anomaly Management Procedures. This report shall be made to the ESMO Mission Director within one business day; unless the anomaly is mission threatening in which case the ESMO Mission Director shall be notified immediately. A summary of the anomaly shall be received via e-mail within one business day. The definition of an anomaly for the operational phase of the EOS mission is as follows:

- Any spacecraft or ground system component not operating or functioning as expected, does not perform as expected, or exhibits behavior considered being different than normal.
- Any flight operations procedure, or stored command activity, that produces unexpected results or fails to produce its desired results.
- Any yellow or red limit violation on any telemetry parameter, or status flags in telemetry, which indicate an error has occurred, or abnormal trends in telemetry data.
- Any configuration or state of the spacecraft that is unexpected or potentially harmful to the health and safety of the spacecraft or instruments.
- Any other abnormal event or behavior that could potentially indicate a malfunction of the flight or ground system hardware or software.

The ESMO Mission Director, or designee, is responsible for generation of all formal NASA Anomaly Reports, which were formally referred to as NASA Incident Reports.

For each anomaly the Contractor shall generate an Anomaly Closeout Report. This report shall describe how the anomaly was discovered, what were the results of the anomaly investigation, the impact of the anomaly, any interim work-

around (if required), and the final resolution of the anomaly. The Anomaly Closeout Report shall be provided to the ESMO Mission Director within 10 business days of resolution of the anomaly.

The Contractor shall maintain a database of all spacecraft and ground-based flight operations anomalies. The Contractor shall report on the status of all open anomaly investigations at all monthly status reviews or as requested by the ESMO Mission Director. As directed by the ESMO Mission Director, the Contractor shall enter EOS spacecraft anomalies on a case-by-case basis into the GSFC Spacecraft Orbital Anomaly Reporting System (SOARS).

Support for Resolution of On-Orbit Anomalies: The Government is responsible for maintaining and managing an Anomaly Recovery Team (ART). In addition, the Government shall be responsible for any augmentation of technical staff to support anomaly analysis. The ART shall have lead responsibility for analysis of anomalies that are determined to be the result of the performance of an on-orbit system or subsystem, or a result of a procedural error. The ART is also responsible for development of a corrective action recommendation to be given to the ESMO Mission Director. The Contractor shall participate in the analysis of such anomalies in support of the ART, when requested by [redacted] the ESMO Mission Director. The Contractor shall also implement corrective actions as authorized by the ESMO Mission Director.

Support for Resolution of Ground-based Anomalies: [redacted] the ESMO Mission Director, the Contractor shall have responsibility for analysis and resolution of anomalies that are determined to be the result of performance or failure of a ground-based system or subsystem, or a result of procedural error.

A.2.2.2 Performance Analysis and Trending

The Contractor shall collect and store the housekeeping and health and safety data from the Terra, Aqua and Aura spacecraft. The Contractor shall also process, trend and analyze these data on a short-term, long-term and periodic basis depending on the specific parameters and objectives. The Contractor shall identify any parameters that might demonstrate unacceptable performance degradation with time and trends that could lead to future performance loss or degradation of flight hardware in the Monthly Spacecraft Performance Report.

In addition, ad hoc reports shall be generated as needed to support anomaly investigations, maneuver planning, and any special reports requested by ESMO Mission Director.

A.2.2.3 Spacecraft & Instrument Off-Line Engineering Support

The Contractor shall provide off-line engineering support for the spacecraft and its instruments for all special engineering activities and contingency operations. Off-line, in-depth analysis shall be performed in order to validate spacecraft subsystem and instrument performance as well as to investigate any anomalies or trends that may occur. This includes support to investigation of any instrument anomalies.

The contractor shall maintain a set of configuration controlled flight operations procedures, which include procedures for nominal, special and contingency operations.

The Contractor shall maintain and update documentation, plans and procedures as required supporting mission operations and mission support activities.

The Contractor shall maintain and update the spacecraft manufacturer provided documentation as needed.

The Contractor shall maintain and update flight team training plans and provide the necessary training as classroom training, training exercises, and simulations.

The Contractor shall develop and maintain spacecraft models and analysis tools as required for off-line engineering support of normal and special flight operations activities and contingency analysis activities.

Support Ground System Upgrades and Technology Refresh Activities: The contractor shall participate and provide support to all activities related to ground system changes or technology refresh activities. The Contractor shall assess the potential level of impacts and risk to normal mission operations activities for all ground system changes. The Contractors shall raise any issues of concerns and risk to the ESMO Mission Directors as results of changes to the ground system.

Instrument and Science Support: The Contractor shall support all instruments and sciences activities related to calibrations, anomaly resolution, reconfiguration and planning of instrument sciences activities. The Contractor shall also provide direct support to the ESMO Science Interface Manager for all activities requiring flight operations intervention, consultation and technical expertise. The Contractor shall participate in all Science Team Mission Operations Working Group (MOWG) Meetings as requested by the ESMO Mission Director or the ESMO Constellation Team Manager. Participation may be via teleconference or may require travel to the Science Team Meeting at the request of the ESMO Mission Director or the ESMO Constellation Team Manager.

Configuration Management Process: The Contractor will follow established configuration management processes for all FOT products including documentation of new or updated products, peer review and internal sign off. The products will be presented to the Configuration Manager at the in-house Configuration Control Board meeting prior to being finalized.

Automation Support: The contractor shall support EOS automation development and implementation activities.

A.2.2.4 Spacecraft Subsystems and Associated Operations

The Contractor shall plan, rehearse, perform and assess real-time, special and contingency operations, which involve or impact any Terra, Aqua or Aura spacecraft subsystem. The Contractor shall support operational engineering and performance analysis of, at a minimum, the Electrical Power Subsystem (EPS), Thermal Control Subsystem (TCS), Flight Software (FSW), Command and Data Handling Subsystem (C&DH), Guidance, Navigation and Control Subsystem

(GN&C), Radio Frequency Communications Subsystem (Comm.) and the Propulsion Subsystem (Prop).

For the EOS Aqua and Aura spacecraft, the Contractor shall take advantage of the economy-of-scale efficiencies of operating two nearly identical spacecraft busses to consolidate and combine off-line spacecraft subsystems engineering positions wherever feasible while maintaining adequate engineering staff to safely and effectively operate the missions.

A.2.2.5 Flight Operations Mission Library

The contractor shall maintain a library of current operating documents and reports for the Terra, Aqua, and Aura missions. This library shall serve as a repository for:

- The mission history as captured in the weekly, monthly and anomaly reports
- Flight operations training materials and certification records
- On-console reference materials for flight operations activities

The contractor shall maintain an archive of all flight operations procedures, activity plans, timelines, and Command Authorization Meeting (CAM) presentations.

The Contractor shall maintain all Instrument Operations Agreement documents and keep them current in consultation with the instrument operations teams and the ESMO Science Interface Manager and ESMO Mission Director.

A.2.2.6 Ground Systems Engineering Support

The Contractor shall work closely with the Ground Systems Maintenance and Operations Contractors, provided under separate contracts and/or GSMO Tasks, to ensure that planned IT Security-related ground system re-engineering activities and planned system upgrades do not interrupt on-going mission operations of the EOS Terra, Aqua and Aura spacecraft.

The FOT (on duty 24 hours-per-day) will report all ground system anomalies in accordance with the ESMO anomaly reporting procedures.

A.3. Performance Metrics

The following metrics are intended as example indicators of the EOS mission accomplishments and performance relative to mission requirements and objectives.

Spacecraft contacts successfully supported is a key element of measurement, reflecting the frequency and nature of EOS spacecraft contacts that are routinely and successfully supported on a daily basis.

Successful verses unsuccessful preparation and execution of command and control sequences reflects performance of the FOT with regard to accuracy and timeliness of the process to formulate and execute instructions to the on-orbit asset.

Science data scheduled and acquired is a measure of the effectiveness of the Solid State Recorder (SSR) management to meet the long-term acquisition plan, the translation of that plan to daily command sequences, and the effectiveness of delivering data acquired by the instrument to the designated ground receiving facilities.

Science data scheduled but not acquired is a measure of the problems encountered in attempting to fill out a data acquisition schedule, and of the operational practice of identifying and documenting failures in daily acquisition management.

Anomalies detected, analyzed, reported and resolved is a measure of the operational response to ad hoc situations and unexpected occurrences, and the performance of the Contractor in responding to these demands.

Interface coordination activities are a measure of the effectiveness of coordinating and communicating with the various operational elements of the EOS mission operations support system required to carry out daily operational activities.

State of documentation (procedures, operating instruction, etc.) is a measure of the attention to detail and the thoroughness applied to maintaining documentation files regarding the state of the systems and operational procedures employed in flight operations.

Adherence to existing and developed configuration control mechanisms will be an indication of the procedural discipline enforced by the Contractor and their commitment to sound engineering and operational practices.

The smooth operation of the EOS mission operations support system relies on a well-trained and motivated FOT. On a monthly basis, the Contractor shall report on the status of staffing levels, training and certification activities and identify any known areas of future attrition.

The performance metrics defined in general terms here shall be reported through regular monthly meetings, reports, and briefings presented by the Contractor and reviewed by the ESMO Mission Directors and ESMO Project Management Staff.

B. Management Reporting

The Contractor shall provide monthly status reports and reviews on the technical, cost, schedule and operational performance in accordance with the WBS to adequately describe the activities of the task to the Task Monitor.

C. Contractor Controlled Property

The Contractor shall assist the GSMO contract managers and property custodians in maintaining the overall list (NPROP) of government owned property used by the Contractor on this Task Order. This support includes preparation and cooperation during property audits.

IV. Government Furnished Facilities, Equipment, Software, and Other Resources

The Contractor shall establish the EOS mission operations workforce within the primary EOS Operations Center (EOC) currently located in Building 32 at the GSFC. The Contractor shall temporarily relocate the FOT, and any other required portions of the EOS mission operations workforce, to the Backup EOS Operations Center (BEOC) located at the GSFC, as needed, by direction of the ESMO Mission Director. The Contractor shall provide all office supplies and consumables used in the daily operation of these facilities.

The Contractor shall perform flight operations in the Backup EOS Operations Center (BEOC) on an as needed basis, by direction of the ESMO Mission Director. The Contractor shall maintain the BEOC systems to provide a ready capability for relocation of operations and resumption of nominal flight operations within 2 hours of the loss of Building 32's EOC flight support functionality. The Contractor shall exercise the BEOC on a regular basis to demonstrate support capability and readiness status.

V. Material Procurement

The Contractor shall propose material that they identify as necessary to perform the work associated with this Task Order.

VI. Travel Support

The Contractor shall propose travel that they identify as necessary to perform the work associated with this Task Order.

Specifically, the contractor shall support the travel requirements as described in the table below:

Travel Description	Approximate Time Frame
Terra ASTER Coordination Meeting NASA/GSFC, Greenbelt, MD 3-day meeting, No travel required	February 2015
A-Train Mission Operations Working Group Meeting (MOWG) NASA/GSFC, Greenbelt, MD 3-day meeting, No travel required (Except [redacted] SME)	June 1-5, 2015
Terra ASTER Instrument Interface Meeting NASA/GSFC, Greenbelt, MD 3-day meeting, No travel required	June 2015
Aqua AMSR-E Science Team Meeting (STM) & FOT/IOT MOWG NASA/MSFC, Huntsville, AL 2-day meeting (3 nights) with rental car Aqua Flight Systems Manager (FSM)	September 2015
Terra ASTER STM and Ground Data System Interface Meeting Tokyo, Japan 5-day meeting (6 nights) Shuttle/taxi – no rental car Terra Flight Systems Manager (FSM) and Instrument Engineer	September 2015
A-Train MOWG NASA/JPL: Pasadena, CA	February 2016

3-day meeting (4 nights) with rental car Aqua or Aura FSM and 1 GNC Engineer Terra FSM and GNC Engineer [redacted] Collision Avoidance Subject Matter Expert (SME)	
Aura Science Team Meeting (STM) & FOT/IOT MOWG NASA/JPL : Pasadena, CA 3-day meeting (4 nights) with rental car Aura Flight Systems Manager (FSM) and Instrument Engineer	NET Spring 2016

Travel Description	**Approximate Time Frame**
Terra ASTER Coordination Meeting NASA/GSFC, Greenbelt, MD 3-day meeting, No travel required	February 2015
A-Train Mission Operations Working Group Meeting (MOWG) NASA/GSFC, Greenbelt, MD 3-day meeting, No travel required (Except [redacted] SME)	June 1-5, 2015
Terra ASTER Instrument Interface Meeting NASA/GSFC, Greenbelt, MD 3-day meeting, No travel required	June 2015
Aqua AMSR-E Science Team Meeting (STM) & FOT/IOT MOWG NASA/MSFC, Huntsville, AL 2-day meeting (3 nights) with rental car Aqua Flight Systems Manager (FSM)	September 2015
Terra ASTER STM and Ground Data System Interface Meeting Tokyo, Japan 5-day meeting (6 nights) Shuttle/taxi – no rental car Terra Flight Systems Manager (FSM) and Instrument Engineer	September 2015
A-Train MOWG NASA/JPL: Pasadena, CA 3-day meeting (4 nights) with rental car Aqua or Aura FSM and 1 GNC Engineer Terra FSM and GNC Engineer [redacted] Collision Avoidance Subject Matter Expert (SME)	February 2016
Aura Science Team Meeting (STM) & FOT/IOT MOWG NASA/JPL : Pasadena, CA 3-day meeting (4 nights) with rental car Aura Flight Systems Manager (FSM) and Instrument Engineer	NET Spring 2016

VII. Deliverables

The Contractor shall provide the following deliverables in support of the Task Order:

ID	Deliverable Description	Due Date
1	**Mission Impact Reports:** The Contractor shall generate in real-time or near real-time Mission Impact Reports (MIRs) that document anomalous behavior exhibited by the EOS spacecraft or ground system.	As required
2	**Weekly Mission Top Ten FOT Priorities List:** The Contractor shall generate a Weekly list of FOT priorities and status of on-going tasks, anomalies, and	5:30pm Monday, Weekly, unless otherwise deferred

	investigations by mission. This list will be reviewed with the Mission Director at the start of the week to prioritize work assignments and coordinate activities.	due to holiday or extenuating circumstances.
3	**Monthly Spacecraft Performance Report:** The Contractor shall generate Monthly Spacecraft Performance Reports. The report shall include, as a minimum, a summary of the overall status and performance of the spacecraft and its instruments for the week, operational statistics, major upcoming activities, and status, performance, and plans for each spacecraft subsystem, flight software, and all spacecraft instruments. The report shall discuss the results of the trending analysis and highlight any areas of potential concern. Performance information and analysis results shall be transferred back to the spacecraft manufacturer so that any lessons learned may be applied to future missions.	Reports shall be provided to the ESMO Mission Director within two-weeks of completion of the reporting period.
4	**Monthly Status Report:** The Contractor shall present a report on the activities of the preceding month. This report shall contain, but is not limited to, a summation of standard operational events, a listing of special activities, an accounting of instrument activities including non-nominal events, issues from the month, Non-nominal events due to FOT errors, science data collection statistics, anomaly metrics, staffing status, training/certification metrics, special initiatives, planned activities and cost/budget status. The ESMO Mission Director may require additional items to be addressed on a periodic basis. A softcopy of this report will be provided to the ESMO Mission Director and ESMO Management on the day of the presentation.	On a monthly basis
5	**Command Authorization Meetings:** The Contractor shall collect and present technical support data for the preparation and implementation of all special spacecraft engineering activities. All special spacecraft engineering activities will be preceded by a Command Authorization Meeting (CAM). Presentation materials and products relevant to the CAM will be distributed as early as practical prior to the CAM, so that CAM attendees can review them for accuracy and prepare questions and comments in advance of the CAM.	Prior to scheduled activity, normally the day preceding the activity
6	**Technical and Managerial Meeting Reports:** The Contractor shall generate minutes and capture actions items from any ad hoc technical and/or management meeting as requested by the ESMO Mission Director. The Contractor shall track action items arising from the meetings for response and resolution and report status at follow-up meetings.	As required, within 24 hours of the meeting
7	**Anomaly Reports:** For each anomaly, the Contractor shall generate an Anomaly Report. This report shall describe how the anomaly was discovered, what were the results of the anomaly investigation, the impact of the anomaly, any interim work-around (if required), and the final resolution of the anomaly.	The Anomaly Report shall be provided to the ESMO Mission Director within 10 business days of the resolution of the

		anomaly.
8	**Annual Spacecraft Performance Report:** The Contractor shall generate an Annual Spacecraft Performance Report that contains the same content as the weekly report except that engineering evaluation of spacecraft performance shall be more detailed. Special emphasis in the annual report shall be placed on long-term spacecraft subsystems and instrument performance trends. Particular attention shall be paid to long-term performance trends that reflect the amount of remaining mission life or are of a consumable nature. Annual Spacecraft Performance Reports shall be delivered at the Annual Performance Review.	Scheduled in the first quarter of the year following
9	**Annual Performance Review:** The contractor shall present to the ESMO Project an operations concept for the next year considering the mission's current status, expected budget, and risk tolerance. The contractor shall recommend changes to the systems that support the mission to achieve the mission's cost and performance goals.	Scheduled in the first quarter of the year following
10	**EOS Automation Operations Concept Document:** The contractor shall maintain an EOS Automation Operations Concept that takes advantage of economy-of-scale efficiencies of operating the two nearly identical Aqua and Aura spacecraft busses, and automation initiatives that are being implemented for the EOS Terra, Aqua and Aura ground systems and/or flight systems to enable reductions in operations costs for all three EOS missions. This activity shall be coordinated with EDOS and other elements of the ground system to ensure an end-to-end concept and plan that is acceptable to the user community.	This document shall be maintained current with any changes that have been approved and updated annually concurrent with the annual performance review.
11	**End-of-Mission Plans:** Working with NASA personnel, the Contractor shall prepare and update on an annual basis End-of-Mission Plans for each EOS spacecraft. The final version of each mission's plan shall be delivered to ESMO Management 6-months prior to the mission entering its Decommissioning Phase.	Annually, or as requested
12	**Training and Certification Plan:** The Contractor shall establish, maintain and execute a formal training and certification program. The objective of this program shall be to assure mission success by cultivating a diverse, competent staff of FOT professionals. This program shall include an active process of progressive skills enhancement, cross-training and contingency operations readiness. The program shall include a matrix of FOT positions and skills with defined certification levels and targeted staff certification goals. The program shall be documented in the Training and Certification Plan. The plan shall identify what positions within the Flight	As required and Monthly metrics reporting

	Operations Team (FOT) are considered certifiable and what frequency of re-certification is necessary to maintain competency. The plan shall specifically address formal (classroom) training, on-the-job training (OJT), simulations and rehearsal training and cross-training. The plan shall address assumed certifications, post-training certifications, cross-position certifications and the currency of all certifiable positions. The Contractor shall report metrics on training and certification on a monthly basis.	
13	**Anomaly Response Plan:** The Contractor shall establish, implement and maintain a mission-level Anomaly Response Plan that's consistent with NASA/GSFC's Code 400 Flight Programs and Projects Directorate Anomaly Notification Procedures and Guidelines and ESMO's Anomaly Management Procedures.	As needed, annual review minimum
14	**Mission Risk Management and Best Practices:** The Contractor shall establish, implement and maintain a mission-level Risk Management Plan that's compliant with NPG 7120.5. In addition, the Contractor shall comply with all Agency, Center and ESMO directives regarding Risk Management and Best Practices.	As needed, annual review minimum
15	**Operations Procedures:** The Contractor shall update and revise the Operations Procedures as required to address changes in the procedures and/or operational concepts for the EOS flight and ground systems.	As required and Monthly metrics report
16	**Test Reports:** The Contractor shall provide findings from ground system-related testing activities performed by the Flight Operations Team (FOT). The Test Report shall include Discrepancy Reports (DRs) corrected and verified, new DRs opened, and the FOT recommendation to accept and/or reject the release being tested.	Test reports shall be delivered within 2-weeks of test completion.
17	**Financial Reports:** The Contractor shall provide monthly financial reporting by mission and by combined total task. Reporting will provide 533M level information by mission (Terra, Aqua and Aura) and contain sufficient detail to allow long-term budget planning.	Monthly, not later than 10 working days following the close of the contractors' monthly accounting period
18	**Final Task Order Report:** The Contractor shall provide a comprehensive Task Order Self-Evaluation Performance Report by completion of the task order period of performance. The report should be in narrative form and include tables, graphs and diagrams to summarize task performance. The report shall include the final incurred task order cost along with recommendations and conclusions.	By completion of the task order period

End of Task Order Statement of Work

August 21, 2015

GSMO Task Order SOW

Task No:	**040**
Modification:	7
Task Name:	SN Ground System Engineering and Integration Support
Task Period of Performance:	03/01/2012 to 08/31/2016
Modification Period of Performance:	09/01/2015 to 08/31/2016
GSMO SOW Reference:	2.1, 2.2

Task Order History

Description of current modification (**Modification 7**)

Modification to the SN Ground System Engineering and Integration Support task extending the support to provide continuing Systems Engineering support for the SN and extending the Period of Performance by 12 months.

Mod #	Start	End	Brief Description
0	03/01/2012	02/28/2013	Initial task order statement of work.
1	12/01/2012	11/30/2013	Add TDRS-L/M and TDRS ITPS ops support, and extend PoP by 9 months.
2	12/01/2013	02/28/2014	No-cost extension.
3	03/01/2014	08/31/2014	No-cost extension.
4	05/16/2014		Administrative modification.
5	09/01/2014	08/31/2015	Extend PoP by 12 months.
6	01/27/2015	08/31/2015	Add Subtask 5 to support TDRS battery management.
7	09/01/2015	08/31/2016	Extend PoP by 12 months.

Background

The Space Network Project, Code 452, is responsible for the ongoing operations and maintenance of the TDRS-based Space Network (SN). This task requires:

- Systems engineering support for the continued operations and maintenance of the SN
- Analysis of the SGSS system and the integration of SGSS into the SN (being developed under the SGSS Project).
- Operations maintenance for the GSFC-located TDRS Engineering Support Facility (TESF), an SN facility that provides offline TDRS spacecraft telemetry trending and analysis support
- Support for the TDRS-K/L/M ITPS system to be used for on-orbit testing and eventual operations
- Support TDRS battery management support

Requirements

1. Space Network Systems Engineering Support

The Contractor shall provide the SN with systems engineering support for the SN ground project. Under this task, the Contractor shall execute medium complexity systems engineering studies in support of the continued operations and maintenance of the current SN as well as the preparation and analysis of the Space Network Ground Segment Sustainment (SGSS) project, the next generation of the SN. Additionally, the contractor shall provide support for a study of scheduling systems for both the future of SGSS scheduling and a larger integrated scheduling tool for NASA communications network services.

2. TDRS Engineering Support Facility (TESF) Sustaining Engineering Support

The TESF provides the ability for the GSFC TDRS spacecraft engineers to monitor, trend, and analyze TDRS housekeeping telemetry data that is received from the White Sands Complex (WSC) via the Telemetry Backfeed link. The TESF is comprised of two systems that provide this support: the Real-Time Monitor System (RTMS) and the Integrated Telemetry Processing System (ITPS). The physical RTMS and ITPS systems reside in GSFC Building 12.

This support will also be used when TDRS-K provides the SN with a Real-Time Command and Telemetry System (RCTS) and an ITPS. These systems shall be incorporated into the existing TESF rack and infrastructure.

The contractor shall provide system administration, network engineering, hardware engineering, IT security, and facility engineering support to the TESF systems. The support shall be provided on an as needed basis to facilitate systems patching and anti-virus updates to comply with IT security requirements, to troubleshoot and resolve hardware failures, to update the IT security documentation, to perform security scans as required, and to provide facility related support including UPS and other power related problem resolution.

3. Integrated Trending & Plotting System Support

For the ITPS, the contractor shall provide development and sustaining engineering support, along with technical support pertaining to the ITPS systems (hardware and software).

For the ITPS specifically, the contractor shall provide the following for the operational TDRS satellites:

- Update ITPS system documentation.
- Conduct ITPS feature training.
- Define mission-specific requirements associated with enhancements or discrepancy resolution.
- Define hardware specifications for any required hardware.
- Provide support for ground system testing and verification.
- Formally deliver ITPS general and TDRS specific software releases (hardware, software, including MATLAB, and associated documentation).
- Report and track ITPS software issues and enhancement lists.
- Provide ITPS user support for technical questions and system problems consultation.

- Support the TDRS K/L/M project on any ITPS related technical issues during the integration and test of the ITPS into the TDRS K/L/M Transition Operations Control Center (TOCC) at WSC. Note that a different contractor is doing the actual integration work of the systems in the TK TOCC.

The contractor shall provide the following TDRS-K/L/M ITSP support:

- Provide the TDRS K/L/M project with ITPS development and maintenance, responding to discrepancies and requests for new and enhanced capabilities.
- Provide technical consultation support for the operations and engineering teams at WSC and GSFC.
- Ensure that the ITPS activities related to the operational TDRS satellites (3-10) do not interfere or affect the ITSP activities conducted for the TDRS-K/L/M satellites, and vice versa.
- Support the TDRS K/L/M project on any ITPS related technical issues during the integration and test of the ITPS into the TDRS K/L/M Transition Operations Control Center (TOCC) at WSC. Note that a different contractor is doing the actual integration work of the systems in the TK TOCC.
- Support TDRS K/L/M reviews associated with pre-launch testing and launch readiness as requested by the government.
- Develop native ITPS MATLAB output capability allowing single step creation of MATLAB-ready ITPS output files. This ITPS feature shall provide the following capabilities at a minimum:
    - Ability to browse through the all ITPS archived telemetry (all LRV's and time range) and identify the time period (MDY HMS) of interest.
    - Ability to save the telemetry encompassing the period of interest as a changes-only, binary format MATLAB file (.mat extension) to a folder created by the user on a storage medium as specified, allowing the files sizes to be kept at a manageable level.
    - Ability to save the MATLAB files to a hard-drive on the same or a separate PC or server, or to a USB memory stick.

In order to provide the required ITPS support, the contractor is expected to provide personnel who (1) have thorough knowledge of the TDRS ITPS Ground Software System, including the requirements, hardware and software design, (2) are proficient in the use of the C++ and JAVA (for web development) computer languages, and (3) have thorough expertise with TDRS spacecraft telemetry processing.

For context and to assist in costing, the contractor shall provide a primary support role for the ITPS, and shall assume that the support required for the other systems in the TESF augments the primary support provided by a different contractor. This secondary support is anticipated to only be needed on an occasional basis.

4. Facility Engineering Support

The [redacted] will provide facility-engineering support for potential facility alterations at Goddard Space Flight Center and the White Sands Center.

5. TDRS Battery Management Support

Provide on-site electrical systems and power system engineering support to TDRS Sustaining Engineering in maintaining and extending operational life of the TDRS spacecraft and payload. Specifically, this task shall provide technical support and

expertise in operational assessment, anomaly investigation/resolution, procedural development/enhancement and related technical support pertaining to TDRS spacecraft operations and maintenance as well as providing regular reporting to the Space Network Project management.

This task requires a senior electrical systems engineer knowledgeable in the TDRS electrical systems, solar array, power system and battery design (both NiCad and Ni-H designs) for all three TDRS spacecraft generations. The work shall include but not be limited to all aspects of spacecraft systems operation and anomaly support with significant support elements provided in the list below.

The Contractor shall provide support in the following (as related to TDRS Spacecraft electrical systems, solar array, power system, battery and spacecraft operations):

(1) Provide electrical subsystem support to the Space Network.

(2) Provide power subsystem support to the Space Network.

(3) Provide battery subsystem support to the Space Network.

(4) Implement, assess and report on spacecraft trending/performance.

(5) Develop, document, and present technical analyses and trades related to spacecraft operation issues.

(6) Provide authoring, reviewing and/or editing support for spacecraft operational/procedural product development.

(7) Participate in anomaly reviews, technical interface meetings and other Project meetings as required.

(8) Participate in regularly scheduled Project meeting and teleconferences.

(9) Review component, subsystem, payload and bus electrical and power system specifications and design documentation in support of investigations.

(10) Participate in development and/or review of spacecraft test procedures.

(11) Review spacecraft test data and assess/validate test performance.

(12) Provide status reports to the Project as required

Work Tracking

The contractor shall ensure that hours and costs associated with the main functions in this task are tracked and documented separately (e.g., as subtasks), and are reported to the government with this separate tracking indicated. These areas are:

(1) Space Network Systems Engineering Support

(2) TDRS Engineering Support Facility (TESF) Sustaining Engineering Support

(3) Integrated Trending & Plotting System Support

(4) Facility Engineering Support

(5) TDRS Battery Management Support

(6) TESF Sustainment Lab Development & Implementation

The contractor shall specify distinct costs for each of these areas in the proposal, and shall propose how this reporting will be accomplished during task execution.

Deliverables

Space Network Systems Engineering Support

The contractor shall deliver bi-weekly and monthly reports summarizing the support and identifying any analyses, issues, concerns and recommendations. The monthly report shall include a cost report. The cost part of the report can be delivered as part of one monthly report, or can be delivered separately, as determined most efficient by the contractor and as approved by the task monitor.

The contractor shall deliver document review comments as requested and as agreed to with the task monitor.

The contractor shall provide timely responses to assigned action items.

TDRS Engineering Support Facility (TESF) Sustaining Engineering Support

The contractor shall deliver descriptions of support performed in the TESF when that support is required within one week of the support. An email to the government containing this description is sufficient.

The contractor shall maintain a running record/log of support provided to the TESF and deliver that report monthly. Delivery to the government via email is sufficient.

The contractor shall deliver updates to the TDRS ITPS hardware and software systems and associated documentation as necessary for TDRS operations use.

The contractor shall deliver updates to the TDRS-K/L/M ITPS hardware and software systems and associated documentation as necessary for TDRS-K/L/M pre-launch and post-launch testing use.

Travel

Occasional travel to WSC in Las Cruses, NM and to the Boeing facility in El Segundo, CA is expected for this support, as well as other facilities and destinations as appropriate. The contractor shall propose the estimates for travel. At least one week before departure, the contractor shall request approval for travel (each trip) from the task monitor, and travel shall only be executed if approved by the task monitor or his/her designee.

Contractor Controlled Property

The Contractor shall assist the GSMO contract managers and property custodians in maintaining the overall list (NPROP) of government owned property used by the Contractor on this Task Order. This support includes preparation and cooperation during property audits.

END

GSMO Task 41, Mod 7 Mission Support Services

GSMO TASK ORDER

Task No: 41
Modification: 7
Task Name: Mission Support Services
Task Period of Performance: 03/01/2012 through 02/29/2016
Modification Period of Performance: 03/01/2015 through 2/29/2016
GSMO SOW Reference: 2.3.1, 3.1, 3.7

I. Task Order History

(**Modification 7**) This modification to the task order Statement of Work (SOW) for Mission Support Services for task #41 extends the period of performance for one year.

Mod #	Start	End	Brief Description
0	03/01/2012	02/28/2013	Initial SOW
1	03/01/2013	02/28/2014	Extend SOW Period of Performance for one year
2	03/01/2013		Administrative Modification
3	07/12/2013		Administrative Modification
4	03/01/2014	02/28/2015	Extend SOW Period of Performance for one year
5	10/10/2014		Administrative Modification
6	11/01/2014	02/28/2015	Provide support for the mission operations team relocation
7	03/01/2015	02/29/2016	Extend SOW Period of Performance for one year

II. Background

This Task Order (TO) Statement of Work (SOW) defines the tasks required to provide mission support services for GSFC's Space Science Mission Operations (SSMO) Project /Code 444

Scope of Work

The Contractor's Facility Implementation Support Team (FIST) and Mission Support Library (MSL) staff shall perform sustaining engineering and associated mission support functions for operational mission systems, testing, development, and facility infrastructure.

The support shall be

- Facilities and assorted support services for Mission Operations Centers (MOCs), Project Office, and associated Mission Office and Support areas.
- Mission Library Services (Systems and Documentation)
- Electrical systems support for SSMO facilities.

Note: This task is not responsible for software development, the Capability Maturity Model Integration (CMMI) requirement does not apply.

A. Requirements

1. Facilities Support

The Contractor shall facilitate maintenance, relocation/reconfiguration of Space Science Mission Operation facilities and support areas.

2. Library Services

The Contractor shall maintain a library of software systems and system and mission related documentation.

3. Electrical Systems Support

The Contractor shall support management and maintenance of Power Distribution Units (PDUs) serving MOCs.

B. Management Reporting

The Contractor shall provide weekly status reports and reviews on the technical, cost, schedule and operational performance in accordance with the WBS to adequately describe the activities of the task to the Task Monitor. Costs shall be reported at a minimum with sufficient information available to attribute costs per mission, and work performed basis.

C. Contractor Controlled Property

The Contractor shall assist the GSMO contract managers and property custodians in maintaining the overall list (NPROP) of government owned property used by the Contractor on this Task Order. This support includes preparation and cooperation during property audits.

The Contractor shall be accountable for all GFE. A summary of GFE hardware and associated software shall be provided

III. Government Furnished Facilities, Equipment, Software, and Other Resources

The Government will provide the facilities and the facility services for those mission support services functions performed on site at Goddard Space Flight Center (GSFC). Office and workstation furniture required to support this Mission Support Services task will be provided.

The Contractor shall be accountable for all Task #41 GFE. A summary of GFE hardware and associated software shall be provided.

IV. Material Procurement

The Contractor shall propose material that they identify as necessary to perform the work associated with this Task Order.

V. Travel Support

The Contractor shall propose travel that they identify as necessary to perform the work associated with this Task Order.

Specifically, the contractor shall support the travel requirements as described in the table below:

Travel Description	Approximate Time Frame
No travel scheduled	TBD -- TM approval

VI. Deliverables

The Contractor shall provide the following deliverables in support of the Task Order:

ID	Deliverable Description	Due Date
1	Financial Reports -- 533 M and 533 Q	By 15th of Month per Contract
2	Weekly Status Reports -- Technical Accomplishments; Risks/problems and possible corrective actions; Performance metrics per Section V	As directed by TM
3	**Semi-Annual Performance Review:** The Contractor shall generate a Semi-Annual Performance Report during award fee period that summarizes the weekly reports. It shall cover the six month performance period and be reviewed with the TM for format and content.	Semi-Annually during award fee period

End of Task Order Statement of Work

GSMO TASK ORDER

Statement of Work (SOW)
For the
Magnetospheric Multi-scale (MMS) Mission
Mission Training Simulator (MTS) Development

Task No: 42
Modification: 7
Task Name: MMS Mission Training Simulator Development
Task Period of Performance: 3/01/2013–03/31/2015
Modification Period of Performance: 11/01/2014-03/31/2015
GSMO SOW Reference: 2.4

I. Task Order History

Description of current modification (Modification 7): This modification does not change any of the requirements for the delivery of the Mission Training Simulator (MTS) hardware/software. It only changes the support period required for III.A.A-2.f and III.A.A-2.g which is post-delivery support for the Mission Readiness Test (MRT) execution using MTS. The cost proposal submitted for this modification should only cover the support for the 6 MRTs described in paragraph III.A.A-2.

Mod #	Start	End	Brief Description
0	03/01/2012	02/28/2013	Initial task order statement of work.
1	03/01/2012	02/28/2013	Administrative Change In TO
2	3/01/2013	2/28/2014	Change In Scope and Period of Performance
3	3/01/2013	2/28/2014	Cost Replan Proposal—No Change In Requirements
4	3/01/2014	10/31/2014	Post Delivery Support Required for MTS and MRT Execution
5	6/19/2014		Administrative Change
6	9/9/2014		Administrative Change
7	11/1/2014	3/31/2015	Post Delivery Support Required for MTS and MRT Execution

II. Background

The Magnetospheric Multi-scale (MMS) mission is a Solar Terrestrial Probe mission comprising four identically instrumented observatories that will use Earth's magnetosphere as a laboratory to study the microphysics of three fundamental plasma processes; magnetic reconnection, energetic particle acceleration, and turbulence. These processes occur in all astrophysical plasma systems but can be studied *in situ* only in our solar system and most efficiently only in Earth's magnetosphere, where they control the dynamics of the geo-space environment and play an important role in the processes known as "space weather".

All four observatories will be operated from a single Mission Operations Center (MOC) located at GSFC. The MOC will be staffed and operated by a dedicated Flight Operations Team (FOT). The Flight Dynamics team will be collocated with the FOT in the MOC. The Science Operations Center (SOC), located at the Laboratory for Atmospheric and Space Physics (LASP) in Boulder, CO, will provide the interface with the instrument teams and is responsible for Instrument Suite (IS) operations.

This task is the continuation of MOMS Task 371 which is to develop the MMS Mission Training Simulator.

III. Scope of Work

The purpose of this task is to continue the MMS Mission Training Simulator (MTS) development effort. The scope shall include early life-cycle development activities including full functionality release in April 2013 (Release 1 and 2 capability combined) and continuation effort for Sustaining Engineering and operational support to 03/11/2015 .

A. Requirements

A-1 Management Approach

The Contractor shall create and maintain a Task Plan that describes the manner in which the Contractor will manage the work for each of the elements identified in this SOW. The task plan will identify major milestones, and resource allocations.

Management responsibility will at a minimum include the following areas:

a. Staff Allocation, Expertise, and Level of Effort
The Contractor shall ensure the availability and competence of the work force necessary to execute the management and technical activities of this Task Order. The Contractor shall manage staff allocation to the required tasks specified.

b. Configuration Management
The Contractor shall support the Configuration Management (CM) policies and procedures established by the MMS Project Office, GSFC Code 461.

c. Information Technology Security
The Contractor shall perform the work specified in this SOW in compliance with the security procedures established by the MMS Project Office.

A-2. Technical

The contractor shall perform MTS design and development including any necessary requirements analysis, engineering studies, trades, and other activities necessary to complete the definition and preliminary design of the MTS in order to maintain the proposed delivery schedule of the first release in October 2012 and second release in April 2013. The effort should include identification and purchase of required commercial hardware and software components to be integrated with the Government Furnished Equipment (GFE) MMS Flight software systems from the MMS Project.

The Contractor shall:

a) Conduct first MTS peer review (tentatively scheduled for 7/31/2012) (completed)
b) Conduct second set of MTS subsystem modeling peer reviews (tentatively scheduled for 1/1/2013 to 3/31/2013)
c) Perform work to complete full functionality release of MTS that includes Release 1 and Release 2 functionality of MTS:
    - Modify VirtualSat kernel for MTS environment for Release 1
    - Develop and/or update VirtualSat components for Release 1
        - Spacecraft configuration
        - Orbit Model
        - Comm Model
        - CFDP Playback Model
        - ACS Component Models
        - CIDP Engineering Model
        - Shells for remaining components (placeholders until Release 2)
            - NAV Model

  - Thermal Model
  - Power Model
  - Propulsion Model
  - FPGA Simulation
  - 1-Hz synchronization
- Modify MMS FSW for integration into MTS Release 1
  - Spacewire modifications
  - CDH Lib modifications
  - IM App modifications
  - OSAL/PSP modification for VirtualSat interfaces
- Integrate Coldfire BSP
- Setup/Configure ITOS for MTS Release 1
- Develop ITOS components for MTS Release 1
  - CIDP Science Simulation
  - Develop VirtualSat Command/Telemetry Database
  - Develop MMS FSW Command/Telemetry Database (conversion from ASIST)
  - Develop VirtualSat display pages
  - Develop VirtualSat low-level STOL procedures
- Acquire and Integrate MTS hardware for Release 1
- Develop MTS documentation for Release 1
  - User's Guide
  - Peer Review 1 package (complete)
  - Conduct Release 2 Peer Reviews for each of the subsystems as-needed 1/01/2013 to 3/31/2013
  - Training material
- Test/Validate MTS Release 1 functionality in Factory Acceptance Test (FAT) at [redacted] with MMS Mission Operations personnel supporting
- Test/Validate MTS Release 1 functionality in Site Acceptance Test (SAT) at the MMS Mission Operations Center (MOC) at Goddard.
- Resolve Discrepancy Reports (DRs) associated with Release 1 capability

d) Begin work on release 2 of MTS:
- Update VirtualSat kernel for MTS Release 2
- Update VirtualSat components for Release 2
  - Spacecraft configuration
  - Orbit Model
  - Comm Model
  - CFDP Playback Model
  - ACS Component Models
  - CIDP Engineering Model
- Develop VirtualSat components for MTS Release 2:
  - NAV Model
  - Thermal Model
  - Power Model
  - Propulsion Model
  - FPGA Simulation
  - 1-Hz synchronization
- Update MMS FSW modifications for MTS Release 2:
  - Spacewire modifications
  - CDH Lib modifications
  - IM App modifications
  - OSAL/PSP modification for VirtualSat interfaces
- Perform ITOS system updates for MTS Release 2
- Update ITOS components for MTS Release
  - Update VirtualSat Command/Telemetry Database

  - Update MMS FSW Command/Telemetry Database
  - Update VirtualSat display pages
  - Update VirtualSat low-level STOL procedures
- Integrate 1-Hz Synchronization card into MTS system
- Test/Validate MTS Release 2 functionality in Factory Acceptance Test (FAT) at [redacted] with MMS Mission Operations personnel supporting
- Test/Validate MTS Release 2 functionality in Site Acceptance Tests (SATs) at the MMS Mission Operations Center (MOC) at Goddard. These will be done in increments which are concurrent with the Dry-Runs for each Mission Readiness Test (MRT) that will use the MTS and be scenario-specific to the individual MRT. This approach is intended to save the cost of having to design an all-encompassing acceptance test for MTS. Mission Operations and Observatory Subsystem personnel will participate in the dry-run and document Discrepancy Reports (DRs) on the subsystem models and Release 2 capability.

e.) Provide sustaining engineering support following Site Acceptance Testing and for Discrepancy Report (DR) resolution. DR resolutions will need to be coordinated with the Task Monitor.

f.) Provide MTS operator support for the development and conduct of Mission Readiness Tests (MRTs) that will be done using the MTS (7 MRTs starting November 2013; Note: Three MRTs (MRT #12, 6, 6a) were completed prior to November 2014. There are 5 MRTs remaining with MTS. The 5 MRTs will be done November 2014 through March 2015.) The support required for these will include development of scenarios on MTS, dry-runs with Mission Operations/Subsystem support personnel and support to operate MTS during the actual run-for – the-record MRT. The 5 remaining Mission Readiness Tests are listed below. Additional preparation time is required for scenario development, dry-runs and any fixes required that come out of the dry-runs. The only exception is MRT 26 which is similar to MRT12 Week-In-The-Life that was already completed but will last 10 days.

- MRT 3 (Constellation Level Maneuver Simulation of Perigee Raise)
- ~~MRT 6/6a (Constellation Level Maneuver Simulation of Formation Maintenance Maneuvers)~~
- ~~MRT 19 (Launch Countdown Through Separation)~~
- MRT 20 (Launch thru Early Orbit Day 4 to 5)
- MRT 26 (End To End 10 Days)
- MRT 6b (Constellation Level Maneuver Simulation of Formation Maneuvers)
- MRT 6c (Constellation Level Maneuver Simulation of Formation Maneuvers)

g) Integrate the Post-Acq FSW Build into MTS – expected delivery of the FSW Build is end of October.

B. Management Reporting

The Contractor shall provide monthly status reporting to the MMS Ground System Manager (GSM)/TM and shall address technical, cost, and schedule performance versus plans for each of the major subtasks identified, showing milestones as appropriate. The Contractor shall report to the GSM, any identified risks (technical, cost, or schedule), consistent with the MMS Project Office continuous risk management plan.

C. Contractor Controlled Property

The Contractor shall assist the GSMO contract managers and property custodians in maintaining the overall list (NPROP) of government owned property used by the Contractor on this Task Order. This support includes preparation and cooperation during property audits.

IV. Government Furnished Facilities, Equipment, Software, and Other Resources

1. MMS C&DH Flight Software

2. MMS Project database

V. Material Procurement

The Contractor shall propose material that they identify as necessary to perform the work associated with this Task Order.

VI. Travel Support

None, no travel expected.

VII. Deliverables

The Contractor shall provide the following deliverables in support of the Task Order. Each deliverable and delivery due date are listed below. Unless specified otherwise, all deliverables will be provided in electronic "soft copy" form and will comply with Project-established documentation and CM standards.

a. System Deliverables

The Contractor shall deliver formal releases of the MOC subsystems during this period of performance as per the following table:

DELIVERABLE	Due Date
Release-1: MTS Hardware	October 2012 (complete)
Full Functionality (Release 1 and Release-2: MTS Software)	April 2013 (complete)
Release 3: Includes Post-Acq FSW Build in advance of MRT20	November 2014

b. Documentation Deliverables

The Contractor shall deliver the following documentation during this period of performance:

DELIVERABLE	SCHEDULE
Weekly Status Report	Weekly
MTS Detailed Development Schedule (updated)	Monthly (complete)
MTS Detailed Design Specification	June 2012 (complete)
MTS Release 1 User Guide	April 2013
MTS Release 1 Release Letter	April 2013 (complete)
MTS Release 1 Test Report	April 2013
MTS Detailed Design Specification (update)	March 2013

c. Meetings and Reviews

The contractor shall support and conduct the following meetings/reviews:

MTS Release 1 design peer review	July 2012 (complete)
MST Release 2 design peer reviews	January 2013-March 2013
Week/Monthly Project meeting	as needed

End of Task Order Statement of Work

Ground Systems and Mission Operations (GSMO)

Task Order Statement of Work (SOW)

Date: February 10, 2012
Task Name: ATLAS Embedded Simulation
Task No. / Mod: 43/0
Contract Number: NNG11VM00C
Task Period of Performance: 04/02/2012 - 03/29/2013
Modification Period of Performance: 04/02/2012 - 03/29/2013

Task Order History

Description of current modification (Modification 0): This is the initial task order statement of work for ATLAS Embedded Simulation.

Mod #	Start	End	Brief Description
0	04/02/2012	03/29/2013	Initial task order statement of work.

Background – ATLAS is the sole instrument on the ICESat-2 spacecraft which is scheduled to launch in 2016. Currently the project is in phase C and is planning on a CDR in October 2012.

Summary of work – The contractor will be involved in the development of a ground simulation used to assist in the develop and test of the Advanced Topographical Laser Altimeter System (ATLAS) algorithms. This includes:

- Support the implementation of the ATLAS embedded simulator.
- Work in-conjunction with the ATLAS flight software development team to design and implement the simulator software according to GSFC/Code 582 approved processes.
- Attend weekly status meetings to review progress and decide on plans forward
- Support the ATLAS flight software verification and validation effort with respect to the developer's software.
- Provide as needed and as directed support to the rest of the ATLAS flight software development and test team to ensure successful delivery of the ATLAS flight software products to the ATLAS project.

Required skills/knowledge - Senior level software development

Period of Performance - The period during which the work for this task shall be performed is from task award through March 29, 2013.

Deliverables/Schedules/Milestones

Ref#	*Deliverables*	*Due Date*
1	Status Reports	Monthly
2	Performance Reports	Monthly
3	End-of-task Report	End of task

ODC (Travel and Procurement) - There is no non-local travel for this SOW.

March 4, 2015

GSMO TASK ORDER

Task No: 44
Modification: 8
Task Name: Explorers Program Pre-Launch and Launch Site Operations Support
Task Period of Performance: 04/01/2012 to 03/31/2016
Modification Period of Performance: 04/01/2015 to 03/31/2016
GSMO SOW Reference 2.1, 3.1, 3.2

Task Order History

Description of current modification (Modification 8): This modification provides additional scope to accommodate Explorers Program Support for the Transiting Exoplanet Survey Satellite (TESS) for the period April 1, 2015, through March 30, 2016. Performance requirements continue as specified in the existing Task Order. This modification will result in a change to the contract value. .

Mod #	Start	End	Brief Description
0	04/01/2012	03/31/2014	Initial task order statement of work.
3	04/01/2013	03/31/2014	Extend task period of performance.
4	06/01/2013	08/31/2013	Added scope and travel for IRIS support resulting from launch slip NET March 18, 2013 to NET June 26, 2013.
5	08/01/2013	03/31/2014	Provide critical launch site and launch support for all current Explorers missions and concludes the support for the IRIS mission
6	08/01/2013	03/31/2014	Replanning
7	04/01/2014	03/31/2015	Continue to provide critical launch site preparation, launch site and launch support for all current Explorers missions. Remove LADEE support.
8	06/01/2014	08/31/2014	Replanning
9	04/01/2015	03/31/2016	Extend period of performance through 03/31/2016

Purpose/Background

This statement of work outlines the contractor support required for pre-launch, launch site and launch operations for the Explorer Missions in support of the Explorers Program Office.

The Explorers Program recently added 2 full missions and 2 missions of opportunity to its portfolio of missions being implemented. Critical launch preparation support is required for required for these missions.

Scope

The contractor will provide support for the Explorer Missions' Projects/Pre-launch meetings, launch operations/processing support, and launch site support, as required. The contractor will have detailed knowledge of Pegasus XL, GSFC, KSC, VAFB, UCB, Kwajalein and Orbital capabilities, processes and operations. The contractor will have detailed knowledge of developing/evaluating VAFB, Kwajalein, Orbital and KSC launch site documentation, as

required. The contractor shall have knowledge of the GSFC/WFF launch requirements and facilities as required.

Specific Task

The contractor shall perform and/or assist the Explorers Mission Managers various critical functions including but not limited to the following functions:

1. Support Project and Mission Integrated/Ground Operation/Launch Operation Working Group (MIWG/GOWG/LOWG) meetings at various locations.
2. Prepare, coordinate, develop and/or review range documentation.
3. Develop/coordinate/review internal and external VAFB, NASA/GSFC, UCB, Kwajalein & KSC data and voice communication interfaces.
4. Coordinate NASA/GSFC, VAFB, Kwajalein, UCB and KSC resources for Mission/Project support.
5. Develop/coordinate/implement/test facilities requirements for each processing location.
6. Support the Mission/Project during the various field operations.
7. Support the Mission/Project at the launch site.
8. Support Explorers Program Support for the ICON and TESS missions and support of the EXPLORERS Office for future mission needs

Travel

- Three trips to Chantilly, VA is planned for a Ground Operations Working Group (GOWG) & Mission CDR.
- Two trips to VAFB, CA for Mission Integration Working Group/Ground Operations Working Group
- One trip to Berkeley, CA for Mission Operations CDR
- One trip to Cape Canaveral, FL for a Ground Operations Working Group (GOWG) meeting.
- Three trips to Hawthorne, LA for Mission Integration Working Group/Ground Operations Working Group

Deliverables

The contractor shall provide a monthly status report to the Task Technical Monitor for each active project. The contractor shall provide a monthly cost report to include total monthly and cumulative travel costs to the Task Technical Monitor for each active project.

GSMO TASK ORDER

Task No: **45**
Modification: 1
Task Name: ACFO Strategic Planning & Organization Transform.
Task Period of Performance: 4/1/2012 to 3/31/2013
Modification Period of Performance: 8/1/2012 to 3/31/2013
GSMO SOW Reference:

I. Task Order History

Description of current modification (Modification 0): Initial Task Order for Task #45.

Mod #	Start	End	Brief Description
0	4/1/2012	3/31/2013	Initial task order statement of work.
1	8/1/2012	3/31/2013	Provide additional surge support in planning changes to the ACFO's strategic communications process by scoping requirements to create a "town square" as a one stop shop for ACFO stakeholders

II. Background

The Advanced Concepts and Formulation Office (ACFO) provides project management expertise that contribute directly to GSFC's strategic planning activities and manages proposal and pre-formulation teams chartered to capture new space flight missions, conduct mission and instrument level studies and integrate the vision of our stakeholders to further the Center's role in scientific exploration.

III. Scope of Work

The Contractor shall assist the ACFO in optimizing the Center's organizational approach through transformation and change management processes.

A. Requirements

A.1. The contractor shall provide a roadmap on how change management activities will be addressed in an integrated, holistic and concurrent way that minimizes rework in solving issues and problems.
A.2. The contractor shall address "best-in-class" transformation and change management and strategic planning implementation, through an approach that addresses change in incremental steps through use of a thorough and detailed methodology with a proven and repeatable approach for analysis, recommendation and implementation support that provides a roadmap for needed improvements and better alignment with the organizational structure.
A.3. The contractor shall prioritize opportunities for improvement by creating a organization improvement roadmap for Strategic business capture.
A.4. The contractor shall define specific implementation activities and tools to address improvement areas

A.5. The contractor shall provide a gap analysis to illustrate gaps between current and future state.

A6. The contractor shall provide an assessment of current capabilities and the need for change.

A.7. The contractor shall provide additional surge support in planning changes to the ACFO's strategic communications process by scoping requirements to create a "town square" as a one stop shop for ACFO stakeholders.

B. Management Reporting

The Contractor shall provide monthly status reports and reviews on the technical, cost, schedule and operational performance in accordance with the WBS to adequately describe the activities of the task to the Task Monitor.

C. Contractor Controlled Property

The Contractor shall assist the GSMO contract managers and property custodians in maintaining the overall list (NPROP) of government owned property used by the Contractor on this Task Order. This support includes preparation and cooperation during property audits.

IV. Government Furnished Facilities, Equipment, Software, and Other Resources

Government will provide office space and furniture.

V. Material Procurement

The Contractor shall propose material that they identify as necessary to perform the work associated with this Task Order. The Task Monitor shall concur with the materials list prior to procurement.

VI. Travel Support

{Use the language below to cover travel requirements for the Task Order. If there is no specific travel needs to specify, then either remove the second part and the table, or simply put "none" in the table.}

The Contractor shall propose travel that they identify as necessary to perform the work associated with this Task Order.

VII. Deliverables

The Contractor shall provide the following deliverables in support of the Task Order:

ID	Deliverable Description	Due Date
1	Status Reports to key members of the Senior Team of key requirements progress that represent an iterative process	Monthly

End of Task Order Statement of Work

GSMO TASK ORDER

Task No: **046**
Modification: 8
Task Name: JPSS Ground CDS Support
Task Period of Performance: 03/01/2012 to 02/28/2015
Modification Period of Performance: 03/01/2015 to 02/29/2016
GSMO SOW Reference:

I. Task Order History

Description of Modification 8: Extend task period of performance for another year to continue sustainment efforts for the JPSS Ground CDS.

Mod #	Start	End	Brief Description
0	03/01/2012	02/28/2013	Initial task order statement of work.
1	03/01/2012	02/28/2013	Administrative Change of assigned Project RA
2	04/16/2012	02/28/2013	Addition of systems engineering support, Requirement A-6, for overseeing corrective maintenance of the operational system and support the ground systems refresh effort for the JPSS mission, to be tracked under Subtask 3. Also, associated travel for this effort.
3	06/01/2012	09/30/2012	Extension of system engineering support for development and validation of JPSS-1 Ground System Concept of operations, architecture, simulation and system requirements development for the Block 1.5/2.0 SRR/SDR.
4	10/01/2012	02/28/2013	Extension of systems engineering support for IRD/ICD development, and C3S support for communications links and prototyping efforts for C3S.
5	03/01/2013	02/28/2014	Extend task period of performance for another year; remove subtasks; work associated with this task includes only JPSS Ground CDS support (previously defined as Subtask 1)
6	08/08/2013	02/28/2014	Administrative change of Project RA assignee.
7	03/01/2014	2/28/2015	Extend task period of performance for another year to continue sustainment efforts for the JPSS Ground CDS.
8	03/01/2015	02/29/2016	Extend task period of performance for another year to continue sustainment efforts for the JPSS Ground CDS.

II. Background

The JPSS Ground Project provides mission support capabilities to a heterogeneous constellation of national and international missions including Suomi NPP, JPSS, European Organization for the Exploitation of Meteorological Satellites' (EUMETSAT') Meteorological Observation Program (METOP), Defense Meteorological Satellite Program (DMSP), Japan Aerospace Exploration Agency's (JAXA's) Global Change Observation Mission-Water (GCOM-W), and Windsat. This includes the mission planning and satellite control, satellite data retrieval, routing and pre-processing, data processing and distribution, direct broadcast support, algorithm development and maintenance, on-orbit calibration and validation and long-term trending.

The JPSS Ground Project Discrepancy Review Board (DRB) is the governing board that is responsible for reviewing, assigning, and adjudicating Discrepancy Reports (DRs) generated from the JPSS Ground Project system operations and systems level testing events. The general purpose of the board is to ensure all anomalies discovered on the JPSS Ground Project System and related external segments/elements are recorded as discrepancies when appropriate and are properly managed throughout its resolution lifecycle.

The JPSS Ground Project uses the Comprehensive Discrepancy System (CDS) as its discrepancy management tool. CDS is a legacy tool that was utilized by the NPP Project to record and track all its mission level discrepancies leading up to the NPP launch and through its commissioning. Following the Operations Transition Review (OTR) in March 2012, the NPP CDS system transitioned to the JPSS Ground Project and was used to establish the JPSS Ground DRB baseline.

III. Scope of Work

The contractor shall provide sustainment support for the CDS environment with associated administrative support for use by the JPSS Ground Project Discrepancy Review Board.

A. Requirements

{Provide the specific technical requirements that govern this Task Order.}

A.1. The contractor shall provide sustainment of the JPSS Ground CDS operationally deployed under this task in 2013. The contractor shall perform various functions including database administration, account management, remedy administration, operating system administration, IT security management, hardware maintenance, and user support.

B. Management Reporting

The Contractor shall provide monthly status reports and reviews on the technical, cost, schedule and operational performance in accordance with the WBS to adequately describe the activities of the task to the Task Monitor.

C. Contractor Controlled Property

The Contractor shall assist the GSMO contract managers and property custodians in maintaining the overall list (NPROP) of government owned property used by the Contractor on this Task Order. This support includes preparation and cooperation during property audits.

IV. Government Furnished Facilities, Equipment, Software, and Other Resources

The contractor shall provide laptop computer equipment needed to perform the task in an effective manner, unless provided by the JPSS Ground Project at the customer's discretion. This shall include the standard software application suite used at GSFC. Any special software applications needed to perform the task (e.g. Microsoft Project) will be provided as GFE. Additionally, the laptop shall be compliant to NASA Security requirements and subject to NASA security configuration and audits as necessary.

V. Material Procurement

The Contractor shall propose material that they identify as necessary to perform the work associated with this Task Order.

VI. Travel Support

The Contractor shall propose travel that they identify as necessary to perform the work associated with this Task Order.

VII. Deliverables

The Contractor shall provide the following deliverables in support of the Task Order:

ID	Deliverable Description	Due Date
1	Weekly Technical Status	
2	Monthly Management Report	

End of Task Order Statement of Work